The Illustrations will be issued shortly in the Second volume.

Indira Gandhi National Centre for the Arts

THE

Surgical Instruments of the Hindus

Indira Gandhi National Centre for the Arts

THE

SURGICAL INSTRUMENTS OF THE HINDUS

WITH

A Comparative Study of the Surgical Instruments of the Greek, Roman, Arab and the Modern European Surgeons.

BY

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TO

THE HON'BLE

SIR ASUTOSH MUKHOPADHYAY, Kt.,

Saraswati, Sastra-vachaspati,

C.S.I., M.A., D.L., D.Sc., F.R.A.S., F.R.S.E., F.A.S.B.,

Judge of the High Court of Judicature at Fort William in Bengal,

VICE-CHANCELLOR, CALCUTTA UNIVERSITY,

Ex-President of the Asiatic Society of Bengal,

AND

Chairman of the Board of Sanskrit Studies,

In recognition of his love of Science, his pre-eminent services to the cause of University Education, his administrative ability, and his generous liberality to scholars

AS WELL AS

In grateful remembrance of many acts of kindness,

THIS VOLUME IS

DEDICATED

BY

THE AUTHOR

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PREFACE.

For researches into the state of medicine among the Ancient Hindus, we have several sources of information to scrutinise. The remarks of Dr. Payne regarding the sources of information of Anglo-Saxon Medicine may apply here with still greater force.[1]

First is the evidence of contemporary literature about the craft of physicians and surgeons, since we are sure that there has always been a class of medicine men of one kind or another. Thus we find in the Ṛgveda, the use of artificial limb as a substitute for a limb accidentaly lost[2]. From the Mahābhārata,

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[1] Payne's English Medicine in the Anglo-Saxon Times, P. 7.

[2] चरित्रं हि वैरिवाच्छेदि पर्णम्
आजा खेलस्य परितक्म्यायाम् ।
सद्यो जङ्घामायसीं विश्पलायै
धने हिते सर्त्तवे प्रत्यधत्तम् ॥

Ṛgveda—15th Ṛk., 1st Mandala, 116 Sūkta.

अगस्त्य पुरोहितः खेलो नाम राजा तस्य सम्बन्धिनी विश्पलानामस्त्री, संग्रामे शत्रुभिः छिन्नपदा आसीत् । पुरोहितेन अगस्त्येन स्तुतौ अश्विनौ रात्रौ आगत्य आयोमयं पादं समधत्ताम् । तदेतदाह 'आजा'—आजौ, संग्रामे, अगस्त्य पुरोहितस्य—खेलस्य राजतः सम्बन्धिन्याः विश्पलाख्यायाः, 'चरित्रं'—चरणं, 'वैरिव'—वैः पक्षिणः, 'पर्ण' पतत्रम् इव, 'अच्छेदि हि'—पूरा छिन्नमभूत् खलु । हे अश्विनौ ! युवां अगस्त्येन स्तुतौ सन्तौ, 'परितक्म्यायां'—रात्रौ, आगत्य, 'सद्यः'—तदानीमेव, 'सर्त्तवे'—सर्त्तुं गन्तुम् इत्यर्थः, विश्पलायै 'आयसीं';—लौहमयीम्, 'जङ्घां'—जङ्घापलक्षितं पादम्, 'प्रत्यधत्तम्'—सन्धानम एकीकरणमित्यर्थः कृतवन्तौ ।

Sāyana's commentary.

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we learn that when Parīkṣit, the king of the Kurus, became certain of his approaching death by snake-bite, due to a curse uttered by a sage, he tried to protect himself by the constant attendance of a number of physicians, who were well supplied with antidotes.[1] Again it is stated that when the great warrior Bhīṣma was wounded in war, the skillful army surgeons came to him with the necessary medical and surgical appliances to treat his wounds.[2] From the Mohāvāgga, we learn that Jīvaka, the personal physician of Buddha, practised cranial surgery with success.[3] In the Mālavikāgnimitra, we find the use of charms—a signet

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[1] संमन्त्र्य मन्त्रिभिश्चैव स तथा मन्त्रतत्त्ववित्।
प्रासादं कारयामास एकस्तम्भं सुरक्षितं।
रक्षाञ्च विदधे तत्र भिषजश्चौषधानि च।
ब्राह्मणान्मन्त्रसिद्धांश्च सर्व्वतो वैन्ययोजयत्।

Mahābhārata, Adi Parva, Ch. 42.

[2] उपातिष्ठन्नथो वैद्याः शल्योद्धरणकोविदाः।
सर्व्वोपकरणैर्युक्ताः कुशलैः साधु शिक्षिताः।
तान् दृष्ट्वा जाह्नवीपुत्रः प्रोवाच तनयं तव।
धनं दत्त्वा विसृज्यन्तां पूजयित्वा चिकित्सकाः।
एवं गते मयेदानीं वैद्यैः कार्य्यमिहास्ति किं।
चतुर्धर्म्मं प्रशस्तां हि प्राप्तोऽस्मि परमां गतिं।
नैष धर्म्मो महीपालाः शरतल्पगतस्य मे।
एभिरेव शरैराहं दग्धव्योऽस्मि नराधिपाः।
तच्छ्रुत्वा वचनं तस्य पुत्रो दुर्य्योधनस्तव।
वैद्यान् विसर्ज्जयामास पूजयित्वा यथार्हतः।

Mahābhārata, Bhīsma Parva, Ch. 121, Vs. 5745—5750. (A.S.B. Ed.)

[3] Mohāvāgga, VIII. 1.18.

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ring as a healing talisman for the cure of snake-bite;[1] and also we find there a reference to a class of physicians who specialised themselves in Toxicology (Viṣa-Vaidya),[2] and were held in high esteem for their professional skill by the public.[3] From the Bhojaprabandha, the administration of some kind of anæsthetic by inhalation before surgical operations can be ascertained. Similarly from the books of Law, we know the relations of the profession to society in general. In the Manusaṁhitā, we have unmistakable testimony of the decline of Hindu surgery as the author prohibits the eating of cooked rice from the hands of a surgeon.[4]

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[1] सहि ! देवीए इदं सिप्पिसआसादो आनीदणागमुद्दासणाहं अङ्गुलीअअं सिखिदं णिभालअन्ती तूह उवालभे पड़िदम्हि ॥

Mālavikāgnimitra, Ch. I.

जय।—जेदु जेदु भट्टा। धुवसिद्धी विस्सवेदी। उदकुम्भविधाणेण सप्पमुद्दिआ कप्पिदव्वा। ता अक्खसीअदुत्ति। धारि।—एदं सप्पमुद्दअम् अङ्गुलीअअम्। पच्छा मह हत्थे णम्।

Ibid, Ch. IV.

[2] परि।—ढेदी दंशस्य दाही वा क्षतस्यारक्तमीक्षणम्। एतानि दष्टमात्राणामायुषाः प्रतिपत्तयः ॥ (संप्रति विषवैद्यानाम् कर्म्म।)

राजा।—जयसेने ! धुवसिद्धिः क्षिप्रमाह्रयताम् ॥

Ibid, Ch. IV.

[3] निपु।—पसण्णमुहवण्णो दीसदि। अवि अ धुवसिद्धिणा चिइस्सिदो। मा से असङ्कणिज्जं पावं ॥

Ibid, Ch. IV.

[4] चिकित्सकान्देवलकान्मांसविक्रयिणस्तथा।
विपणेन च जीवन्तो वर्ज्याः स्युर्हव्यकव्ययोः ॥

Manusaṁhitā, Ch. III, 152.

चिकित्सकस्य मृगयोः क्रूरस्योच्छिष्टभोजिनः।
उग्रान्नं सूतिकान्नं च पर्याचान्नमनिर्दशम् ॥

Ibid, Ch. IV, 212.

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Secondly, monuments or inscriptions scattered about the country have to be searched, as references found therein to the science of medicine, are more trustworthy than documents which may have been more or less tampered with by interpolations of subsequent writers. Thus we learn from the Edicts of Aśoka, that hospitals were established by him in different parts of his kingdom, not only for the treatment of suffering humanity but also for the brute creation[1].

Thirdly, personages and scenes in connection with medical practice, and figures of herbs may have been represented in works of art which must be thoroughly examined. But unfortunately we do not possess any such work of art and so we can learn nothing to our purpose from this source. In the interpretation of the subject of the Friezes of the Rani Naur and Ganesha's Cave, Dr. R. L. Mitra says,—"The shampooing in the Ganesa Cave may be for a parent, but the close seat with the right hand round the neck of the male personage in the other, would be highly unbecoming in an unmarried female. But if the stooping figure be taken to be that of a wounded man, a wounded priest for instance, the lady may be a maiden nursing him without any offence to propriety. It is true that the appearance of the figure on the mattress does not indicate suffering from a wound, but in the Rani Naur frieze, the stooping head affords some indication of it."[2]

पूयं चिकित्सकस्यान्नं पुंश्चल्यास्त्वन्नमिन्द्रियम्।
विष्ठा वार्धुषिकस्यान्नं शस्त्रविक्रयिणो मलम्॥

Manusaṁhitā, Ch. IV, 220.

[1] Rock Inscriptions, Edict II.

[2] The Antiquities of Orissa, Vol. II, p. 11.

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Fourthly, the various kinds of surgical instruments preserved in museums are to be examined and the reports of finds of surgical appliances in various localities are to be studied. We know what a flood of light has been thrown on ancient Greek surgery by the steady progress of archæological discovery and finds of instruments at Pompeii, Herculaneum and elsewhere, and by the study of the specimens preserved in the Naples museum, the Athens museum and other museums of Europe. But as far as I have been able to trace, our museums contain no finds supplying us with any information on the subject.

Fifthly, the literature of medicine itself should be thoroughly inquired into and excerpts elucidative of our subject should be compared with one another. "The detailed descriptions of the very numerous Hindu instruments not being very minute or precise, Professor Wilson says, we can only conjecture what they may have been, from a consideration of the purport of their names, and the objects to which they were applied, in connection with the imperfect description given."[1] We are fortunate, however, in possessing a copious medical literature of great merit from very early times. We shall describe the important books in the introductory chapter, with short notices of their authors.

Sixthly, the comparative study of the science at the same period in other countries also furnishes us with valuable materials as regards the state of medicine in a country. It is well known that Sanskrit works are often written in a very terse language

[1] Royle's Antiquity of Hindu Medicine, foot-note, p. 59-60.

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and it might be said with greater truth about the works of early Sanskrit authors, the comment of a learned critic about the style of Thucydides, the famous historian,—"the most obvious and characteristic of his peculiarities is an endeavour to express as much matter as possible in as few words as possible, to combine many thoughts into one, and always to leave the reader to supply something of his own. Hence his conciseness often becomes obscure." I could not form any idea as to the shape of some of the surgical instruments from the descriptions given in the text books, and the commentators are often silent on those passages. But when I read the accounts of similar instruments in Greek and Roman literature, my difficulties at once cleared up. We know with what brilliant results comparative mythology and comparative philology have been studied of late years, and I am sure that a comparative study of medical science by scholars will lead to interesting discoveries. So I have added descriptions of the instruments according to the Greeks, Romans and Arabs at the end of the descriptions given in Sanskrit books: the former serving as commentaries on the latter.

Seventhly, in the accounts of historians, travellers and pligrims from foreign countries, may be found notices of medical science, as they saw it practised during their sojourn in a country, and such impressions, if properly collated, may bear impartial testimony to the progress of the science at the time. Again, we must enquire if the original treatises of medicine can be proved to have been translated into different languages and whether the remedial agents of a country can be traced in the Pharmacopœias of different nations. Thus we

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learn from the accounts of Houen Tsang and Fa Hian that charitable institutions such as hospitals, dispensaries and Pûnyasālās (Houses of Charity) were quite common in ancient India.[1] Arrian informs us in his *Indica* that the study of medicine among the Brahmans was in great favour.[2] We know that the standard works on medicine were translated in Arabic in the 8th Century B. C.,[3] and that various medicinal herbs of Indian origin found their way into the Greek Materia Medica.[4]

Eighthly, we must enquire whether the medical practice of ancient times is still resorted to by the physicians of the present days. The Hindu system of medicine is still being practised all over India, more or less in its original form, and so can still be studied at first hand. But for our present purpose, we derive little or no help from the *Vaids* of the present generation. They know practically nothing about anatomy and surgery which began to decline during the Buddhist era, and finally all vestiges of the science became lost during the Mahomedan rule. I have spared no pains to exhaust these sources of information so far as surgical instruments are concerned. Whether or not I have been fortunate enough to give just the necessary details of instruments from the best accessible authorities without at the same time loading my pages with superflous matter, must be left to the judgment of my readers to determine.

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[1] Beal's Buddhist Records of the Western World, Vol. I., P. 165, 198 and 214; Vol. II., p. 188 and 303.

[2] Arrian's *Indica* c. 27.

[3] Alberuni's India, Sachau's Preface, p. XXX—XXXI.

[4] Royle's Antiquity of Hindu Medicine, p. 77-113.

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Now it may be asked why the Science and Art of Surgery, which was successfully practised in Ancient India, is so much neglected by the present generation of *Vaids*. So let us consider the causes that led to the downfall of Hindu Surgery:

1. The Hindus from a very early period have given up the dissection of human bodies—the only trustworthy method of acquiring anatomical knowledge—merely because it may occasion ceremonial uncleanliness. The Ancient Hindus were, however, free from such prejudices. Manu lays down that mere bathing will purify a Brahman who has touched a corpse,[1] whilst stroking a cow or looking at the Sun, having only sprinkled his mouth with water will remove the defilement due to touching a dead bone.[2] But even in the Manusamhitā, we can trace the decline of Hindu surgery, and his law forbidding any one from eating food from the hands of a doctor evidently refers to a surgeon.[3]

2. The interference of the priests in India, as in Europe played an important part. They began to cure diseases by spells, charms, texts and drugs; and temples have served as consulting rooms for the treatment as much of the diseases

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[1] दिवाकीर्त्तिमुदक्यां च पतितं सूतिकां तथा।
शवं तत्स्पृष्टिनं चैव स्पृष्ट्वा स्नानेन शुध्यति॥

The Institutes of Manu, Ch. V, 85.

[2] नारं स्पृशन्ति सक्थेहं स्नात्वा विप्रो विशुध्यति।
आचम्यैव तु निस्थेहं गामालभ्यार्कमीक्ष्य वा॥

Ibid, Ch. V, 87.

[3] Ibid, Ch. III, 152; Ch. IV, vs. 212 and 220.

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of the body as of the soul. The example of such a temple we still find in Tārakeśvar where many sick people repair to have their maladies cured by dreams, hypnotic suggestions and incubation or temple-sleep. Similar practice was prevalent in Egypt and Greece in olden times. The modern practice of using galvanic rings and abdominal belts is merely an advanced method of indulging in superstitious ideas.

3. The patients always dreaded the surgeon's knife—especially when the use of a general anæsthetic was unknown. At the same time, the comparative success of poultices, actual and potential cauteries, and other external applications have influenced the lay mind that operations by knife are not always needed.[1] The Hindu surgeons themselves believed in similar tenets, for Suśruta, the surgeon, remarks that "of all cutting instruments and their substitutes, caustics (or vegetable alkalies) are the most important, because by means of them, deep and superficial incisions and scarifications may be made, and derangements of the three humours (air, bile and phlegm) may be rectified"; and again he says that "with

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[1] दिव्यौषधिं विना देवि शस्त्रविद्या सुनिष्फला।
वैरूप्यं कुरुते या च दुश्चिकित्स्ये व्यधान्तरे॥
जायन्ते हि यथार्शांसि पाटितानि पुनः पुनः।
किं तत्र शस्त्रसाध्यं स्यात् सुसिद्धैर्भेषजैर्विना॥
धातुनां व्यापदि यत्र भेषजं नैव सिद्ध्यति।
ह्याभये दुस्तरे तस्मिन् शस्त्रमेव विधीयते॥
पुनः संशमनं तत्र धातूनाम् हि प्रशान्तये।
प्रदातव्यं महादेवि शस्त्रादर्व्वाक् ब्रवीमि ते॥

Mahānīlatantra, Paṭola X, vs. 72-74.

regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not reappear, and because it can cure diseases which are incurable by medicines, instruments and caustics."[1] Thus we see that the Hindus were partial to external applications as a cure of surgical diseases, and gradually they neglected the surgical operations—one of the most important means of acquiring knowledge in Morbid Anatomy and of testing the correctness of diagonosis, in the absence of the post mortem examinations of the cadavers. Thus not only surgery but medicine also suffered materially.

4. The Hindus always cherish a high regard for the writings of their sages, and the earliest works on medicine became the standard works and were held sacred. Any violation of their opinions was considered a sacrilege ; and all knowledge thus soon became stereotyped. In later times, none dared to question the validity of the statements contained therein, and though about three thousand years have elapsed, and though the votaries of the science are still honoured and wellpaid, the science instead of improving has markedly deteriorated. In fact, only two authors—Caraka and Suśruta—are original; the later authorities—and there is a vast number of them—were merely their servile copyists who only differed from them when they indulged in some grave errors. We have a parallel in the history of medical science in Europe, where Galen

[1] चारादग्निर्गरीयान् क्रियासु व्याख्यातसद्दग्धानां रोगानामपुनर्भावाद्भिषजश्चस्वचारैरसाध्यानां तत्साध्यत्वाच्च ।

Suśruta, Sūthrasthānam, Ch. XII.

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held his sway over the profession for about two thousand years.

5. One of the potent causes of progressive decadence in the knowledge and practice of surgery amongst the Hindus is the rapid spread of Buddhism in India. Though Buddha sanctioned the use of the lancet in some cases, in cases of a doubtful nature he prohibited the use of instruments in the treatment of even surgical diseases. For example, he allowed the surgical treatment of boils by knife,[1] but he prohibited not only the use of the lancet for treatment of fistula-in-ano but the use of clysters also.[2] As it would be interesting to know the reasons of this prohibition, I quote the story in full from the Mohāvāgga (Sacred Books of the East):[3]

1. Now when the Blessed One had remained at Sâvatthi as long as he thought fit, he went forth on his journey to Râgagaha ; and wandering straight on he arrived at Râgagaha; and there at Râgagaha he stayed at the Veluvana in the Kalandaka-nivâpa.

Now at that time a certain Bhikkhu was suffering from fistula. And the physician (named) Âkâsa-gotta lanced it. And the Blessed One when he was going round through the sleeping-places came to the place where that Bhikkhu dwelt.

2. Âkâsa-gotta, the physician, saw the Blessed One coming from afar ; and when he saw him he said to the Blessed One : ' Let the venerable Gotama come and look at this Bhikkhu's orifice ;

[1] Mohāvāgga, VI. 14. 4 & 5.
[2] Ibid, VI. 22. 3.
[3] Ibid, VI. 22.

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it is like the mouth of an iguana!' And the Blessed One thinking, 'This foolish fellow is making fun of me,' kept silence and turned away. And in that connection, and on account of that, he called a meeting of the Bhikkhu-sa*m*gha, and asked the Bhikkhus: 'Is there, O Bhikkhus, in that Vihâra a Bhikkhu who is sick?'

'There is, Lord.'

'What is the matter, O Bhikkhus, with that Bhikkhu?'

'That venerable one, Lord, has a fistula, and Âkâsa-gotta the physician, has been lancing it.'

3. The Blessed Buddha rebuked (that Bhikkhu), saying, 'This is improper, O Bhikkhus, for that foolish one, unbecoming, indecent, unworthy of Sama*n*as, not allowable and ought not to be done. How can this foolish fellow, O Bhikkhus, allow a surgical operation to be performed in that part of his body? The skin there, O Bhikkhus, is tender, the wound is difficult to treat, the knife is difficult to guide. This will not redound, O Bhikkhus, to the conversion of the unconverted.'

And having rebuked him, the Blessed One, after delivering a religious discourse, said to the Bhikkhus: 'You are not, O Bhikkhus, to allow a surgical operation to be performed upon you in that part of your bodies. Whosoever allows that, is guilty of thulla*kk*aya offence."

4. Now at that time K*h*abbaggiya Bhikkhus, since a surgical opperation had been forbidden by the Blessed One, used a clyster.

They told this thing to the Blessed One.

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'Is it true, as they say, O Bhikkhus, that the *Kh*abbaggiya Bhikkhus use a clyster ?'

'It is true, my Lord.'

He rebuked them, and having delivered a religious discourse, said to the Bhikkhus: 'No surgical opperation is to be performed within a distance of two inches round the anus, and a clyster is not to be used. Whoever does so, is guilty of a thulla*kk*aya offence.'

And thus we find that Jīvaka, the famous surgeon, is said to have cured a case of fistula-in-ano by the single application of an ointment.[1] The operation fell into such disuse that when Śaṅkarāchāryya suffered from the same disease, no surgical aid was thought necessary by the physicians, though it is said that he was treated by renowned doctors of the time.[2]

From Megasthenes, we learn that "among the Sarmans the Hylobioi (living in woods) were held in most honour, and next to them the physicians, who are mendicants and also ascetics, like the class above them and the class below them,

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[1] "And Gîvaka Komârabha*kk*a healed the fistula of the Magadha King Seniya Bimbisâra by one anointing."

Mohāvāgga (Sacred Books of the East), VIII. 1. 15.

[2] अचिकित्स्यभगन्दराख्यरोगप्रसरक्षीणितपङ्किलखशाख्यां ।
अजुगुप्स्यविशीघनादिरूपां परिचर्य्यामकृताऽस्य तीटकार्य्यः ॥
* * * * * * * *
निगदिते मुनिनेति भिषग्वरा विदधिरे बहुधागदसत्क्रियाः ।
न च शशाम गदीबहुतापदीविमनसः पटवो भिषजोऽभवन् ॥

Śaṅkaravejoya, Ch. XVI.

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which consisted of sorcerers and fortune-tellers;"[1] and Strabo[2] mentions that these physicians "cured diseases by diet rather than by medicinal remedies, which were chiefly unguents and cataplasms."[3]

6. No science can flourish without the support of the government of the day. The Hindus became a subject race; and any departure from the traditional store of knowledge in the shape of improvement in the quality and additions to its quantity was neither tolerated by the people, who are proverbially conservative, nor countenanced by the royal court, for the conquerors brought with them and patronised their own hakeems and doctors. Neither the Mahomedans nor the English have taken any real interest in the Indian Medical Science from preconcieved notions that it contains nothing worthy of their perusal. The *Kavirajes* again are so conservative in their opinions that they can not boldly advocate even the use of such drugs as are of unquestionable value in the treatment of diseases, as for example the use of Quinine in Malaria. To this may be contrasted the behaviour of Bhāvamiśra, who lived about three hundred years back and who adopted many medicaments of foreign origin. The consequence can easily be imagined, and in the language of Elphinstone, can be thus described: "Physicians follow the practice of their instructor without inquiry, and surgery is so far neglected, that bleeding is left to the barber, bone-setting to the herdsman, and every one is ready to administer

[1] The Invasion of Alexander the Great. M'Crindle. Appendices. p. 358.
[2] Geography, XV. i. 58-60.
[3] The Invasion of Alexander the Great, M'Crindle. Appendices. p. 368-69.

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a blister, which is done with the juice of the euphorbium and still oftner with the actual cautery."[1]

But we need not enlarge any further. The object of this essay is not to write out an exhaustive dissertation on the Hindu medical science but by a few suggestive facts, however imperfect and fragmentary, to stimulate curiosity and divert attention of the diligent scholars to a vast field of research, which seems as yet to have been only partially explored.

It is proper here to acknowledge that I have on all occasions freely availed myself of the labours of Drs. Wise, Thakore Saheb of Gondal, and the translators of Suśruta Saṁhitā in the Bibliotheca Indica, namely, Dutt and Hoernle. It is a great pity that this translation has not as yet progressed beyond three fasciculi. Hoernle's recent contribution, "Osteology of the Hindus," is a move in the right direction and we hope it to be followed by similar enquiries in other branches of the science. Royle for the first time proved beyond doubt the high antiquity of Hindu medicine, and established its right position in the history of the science. Wise is the pioneer of systematic research in this field of study, and his sympathetic appreciation of the Hindu system of medicine will always be remembered with gratitude by our countrymen. Dutt's Materia Medica of the Hindus is a work of great merit; and I have derived material assistance from the excellent treatise, "History of Aryan Medical Science," by the Thakore Saheb of Gondal. Dr. Ray's History of Hindu Chemistry is a valuable contribution in the cognate subject of chemistry. I have borrowed from these writers largely, but

[1] Elphinstone's History of India, 5th Ed., p. 160.

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I flatter myself it will also be found that I have further collected from various sources a store of valuable information, for which I am in no way indebted to any of my predecessors in the same field of research. The descriptions of the surgical instruments of the Greeks, the Romans and the Arabs, I have taken from the excellent English translations of Paulus Ægineta, the Extant Works of Ætius and the Genuine Works of Hippocrates, prepared by the renowned Adams, for the Sydenham Society. I have also laid the recent monograph, "Surgical instruments in Greek and Roman times" by Dr. Milne, largely under contribution; I only regret that I had no access to the book a little earlier, otherwise much of my labour in search for descriptions of the instruments of the Greeks would have been saved. For the last five years, I have been engaged on this investigation and it was when I had nearly finished, that Milne's book was mentioned to me by the Hon'ble Mr. Justice Asutosh Mookerjee, the Vice-Chancellor of the Calcutta University and the President of the Asiatic Society of Bengal.

To complete the subject, I have added plates of nearly all the varieties of instruments; but they are more or less hypothetical as we do not possess any actual specimens of the instruments of the Hindus. Written descriptions of surgical instruments are uninteresting and often fail to convey the true idea, which could be easily made evident by the pencil. For purposes of comparison I have given drawings of instruments of the Greeks, the Romans and the Arabs, when I thought that they might be of value for the proper elucidation of my subject. I am indebted to many authors

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I am indebted to many authors for some of the engravings of the instruments. I have been careful to give the source whence the borrowed ones are taken, as far as I have been able to ascertain them. If this has been omitted in any case, it is from inadvertence, not from design. My best thanks are due to them and I here acknowledge my indebtedness to the authors for availing myself of their labours without their permission. But many new illustrations will be found, and I have appended my name to those drawn by myself. These figures of the surgical instruments would be found to tally better with the descriptions of the instruments given in the Sanskrit books than the illustrations of the previous authors. The drawings of surgical instruments as given by me would look more like the figures in a modern catalogue of surgical instruments. Some of my friends could hardly believe when they saw the plates that these instruments were known to the ancient Hindus at such an early age. This feeling of amazement and incredulaty as regards the surgical instruments used by the ancient Hindus has its parallel in the observations of Billroth[1] about the surgical instruments found in the excavations at Pompeü and now preserved in the museum at Naples. He says: "It made a pecular impression upon me, when I saw before me this two thousand years old surgical armamentarium of a Roman colleague, differing but slightly in the form of the more ordinary instruments from those of our time. *Ars longa vita brevis.*" Milne[2] also remarks: "The works of those (Paré, Scultetus and Heister) are profusely illustrated with instruments, some of which can plainly be seen to tally exactly with the descriptions of the classical authors."

[1] Billroth's Surgery, Vol. I, Introduction, Page 7. Syd. Soc. Ed.

[2] Greco-Roman Surgical Instruments, P. 8.

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In describing the surgical instruments, I have confined myself strictly to the texts of the authors and commentators whom I have quoted, and have given the original Sanskrit passages in the foot-notes. These will be of great help to scholars who will try to study the subject at first hand, and prosecute further historical inquiries. The references in the foot-notes do not refer to pages of any particulars edition of the work, as such pagination causes inconvenience to the readers who may not secure the edition in question; so we have given the section, and chapter of the book which will be found in any edition.

In the translations of Sanskrit passages, I have endeavoured to follow the original as closely as possible, except where a somewhat free rendering was necessary to make the meaning clear.

The dates of the ancient Hindu authors of Sanskrit medical books cannot be ascertained with certainty. In the first chapter I have endeavoured to discuss briefly their approximate ages. But as I have compared the surgical instruments of the ancient Hindus with those of the Greeks, Romans and Arabs, a concise summary of the chronological dates of the Græco-Roman, Arab, and the later authors would be a great help in the proper elucidation of my text.

Authors.	*Date.*
Pythagoras ...	... 580-504 B.C.
Megasthenes ...	... 300 B.C.
Ktesias ...	... 400 B.C.
Hippocrates ...	... 460 B.C.
Hero of Alexandria	... 285-222 B.C.

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Authors.	*Date.*
Dioscorides	First century A.D.
Celsus	25-30 B.C. to 45-50 A.D.
Scribonius Largus	45 A.D.
Soranus	First century A.D.
Rufus of Ephesus	98-117 A.D.
Galen	131-201 A.D.
Marcellus Empiricus ...	300 A.D.
Antyllus	3rd century, A.D.
Oribasius	326-403 A.D.
Theodore Priscianus ...	4th century A.D.
Caelius Aurelianus... ...	4th or 5th century A.D.
Moschion	5th century A.D.
Actius...	5th century A.D.
Alexendar of Tralles ...	525-605 A.D.
Paulus Ægineta ...	660 A.D.
Serapion	800 A.D.
Rhazes	850-932 A.D.
Haly Abbas	After 950 A.D.
Avicenna	980-1037 A.D.
Abul Cassim	x 1106 A.D.
Avenzoar	x 1162 A.D.
Paré	1509-90 A.D.
Scultetus	1650 A.D.
Heister	1739 A.D.

I can not suffer this work to go forth without offering at least an explanation of, if not an apology for, the delay which has occurred in the publication of this thesis. It is mainly due to the accidental fire which reduced the types and the blocks

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for this work to ashes and distroyed a part of the manuscript. This portion had to be written again. Again the task of reading proof sheets was laid on me entirely. The occupation of a laborious profession encroached on my time; and I was not fortunate enough to secure the co-operation of any worker in this field of research. The result might be anticipated and no one is more conscious of the unsatisfactory issue than myself. I had no experience in proof reading, and so mistakes are not uncommon. Some of the errors will be found corrected in the corrigenda. As regards the corrections of many of the proof sheets of the Sanskrit foot-notes I was assisted by my son Hirendranāth Mukhopādhāya, who helped me much in getting this book completed. The author will feel obliged if informed of any errors that may be detected and of references to informations which ought to have been given, and also for any hints that may make a future edition more useful to the readers. But I have this consolation in my mind that I have not pushed this work through the press hurriedly or prefunctorily and I have done my best. I have laboured with the usual drawbacks of an active professonal life and if this be admitted by the critic as an excuse for errors and failures, I shall be grateful to him.

A copious index has been provided for this work, whereby anything material in the whole book may be readily found out; of which it may be said that it wants no other advantages than such as the author had not power to give.

It would not be out of place here to mention that part of this essay was read before the Asiatic Society of Bengal in June, July and August, 1908. The learned President in his annual address remarked as follows: "In the course of the last

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session Dr. Girindranath Mukerjee submitted to the society a paper of considerable extent, in which he elaborately examined the subject of the surgical instruments of the ancient Hindus. The questions he has raised, as to the priority of Hindu medicine over that of the Greeks, the Romans and the Arabs, are likely to arouse controversy, but in whatever way the question of priority may be decided, it seems to me truly remarkable that the descriptions given in our most ancient books on medicine, of the surgical Instruments then in use, should bear a close resemblance to the descriptions given not only in Greek, Roman and Arab medical writings but in many cases with the descriptions given in modern works on surgery. I trust that this subject, so peculiarly Indian, will not be left alone and will receive the attention from investigators which it undoubtedly deserves."[1]

As regards the transliteration of Sanskrit words, we have employed the method adopted in the Congress of Orientalists and circulated in the Journal of the Royal Asiatic Society, ignoring in fact, the unpleasant characters of the Sacred Book of the East.

[1] Journal and Proceedings of the Asiatic Society of Bengal, Vol. V, 1909, Annual Address, p. XXX.

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I

SANSKRIT AND ALLIED ALPHABETS.

अ . . . . *a*	ओ . . . . *o*	ट . . . . *ṭ*	ब . . . . *b*
आ . . . . *ā*	औ . . . . *au*	ठ . . . . *ṭh*	भ . . . . *bh*
इ . . . . *i*	क . . . . *k*	ड . . . . *ḍ*	म . . . . *m*
ई . . . . *ī*	ख . . . . *kh*	ढ . . . . *ḍh*	य . . . . *y*
उ . . . . *u*	ग . . . . *g*	ण . . . . *ṇ*	र . . . . *r*
ऊ . . . . *ū*	घ . . . . *gh*	त . . . . *t*	ल . . . . *l*
ऋ . . . . *ṛ*	ङ . . . . *ṅ*	थ . . . . *th*	व . . . . *v*
ॠ . . . . *ṝ*	च . . . . *c*	द . . . . *d*	श . . . . *ś*
ऌ . . . . *ḷ*	छ . . . . *ch*	ध . . . . *dh*	ष . . . . *ṣ*
ॡ . . . . *ḹ*	ज . . . . *j*	न . . . . *n*	स . . . . *s*
ए . . . . *e*	झ . . . . *jh*	प . . . . *p*	ह . . . . *h*
ऐ . . . . *ai*	ञ . . . . *ñ*	फ . . . . *ph*	ळ . . . . *l*

ं (*Anusvāra*) . . . *ṁ*	ऽ (*Avagraha*) . . . ’
ँ (*Anunāsika*) . . *m̐*	*Udātta* . . . . . ´
: (*Visarga*) . . . . *ḥ*	*Svarita* . . . . . ^
× (*Jihvāmūlīya*) . *ẖ*	*Anudātta* . . . . . ̱
ᳵ (*Upadhmānīya*) *ḫ*	

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and commentaries. Vāgbhaṭa I,—Aṣṭāṅga Saṁgraha, his age, edition and commentary; Vāgbhat II: Aṣṭāṅga Hṛdaya Saṁhitā, editions and commentaries; Vagbhaṭā III—Rasa Ratna Samuccaya; Mādhavakara:—Nidāna; Vṛnda Madhava:—Siddhayoga; Cakrapāṇidatta:—Cikitsāsāra Saṁgraha, editions; Śāraṅgadhara:—Śārṅgadhara Saṁgraha, editions and commentary; Bhāva Miśra:—Bhava Prakāśa, editions.

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Krauñcamukha or Curlew forceps. Bhṛṅgarāja-mukha or Butcher-bird forceps. Añjalikarṇa forceps. Avabhañjanamukha forceps. Nandi-mukha forceps. II. The Sandaṁśa or Pincher-like forceps: Forceps with and without handles. Forceps with Smooth and rough ends. Epilation forceps. Mucuṭī or Mucundī. Vaṁśabidala or Bamboo forceps. III. Tāla-Yantra or Picklock-like instrument: Ectāla and Dvitāla. The Ear-scoop. IV. The Naḍī-Yantra or Tubular instruments: Kaṇṭhaśalyā-valokinī or Throat speculum. Pañcamuka and Trimukha. Tubular instruments for inspection of arrows. Śalyanirghātanī. The Impellent. Tubular instruments for Piles—for inspection and medication. Śamī. The Rectal Speculum. Calopter. Tubular instruments for the Fistula-in-ano. Tubular instruments for the nose: Nasal Speculum. Nathu-karanī and Yamaka-nathu-karanī. Nasal tubes. The Aṅguli-trāṇaka or Finger-guard. Yoni-Vraṇekṣana or Vaginal Speculum. Diopter. Bivalve Speculum. The tubular instruments for wounds—Vraṇa-vasti or Wound-Syringe. Tubular instrument for ascites. Dākodara yantra or Canula. Tubular instruments for Hydrocele. Tubular instruments for rectal stricture. Tubular instruments for injection into the rectum—Vasti Yantra or Rectal clyster. Uttaravasti or urethral, vaginal and uterine tubes. Catheters. Tubular instruments for inhalation and fumigation. Disinfection of rooms, clothes &c. Tubular instruments for cupping. Śṛṅga or horn. Alābu Yantra or gourd. Ghati Yantra. V. Śalakā

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„	xi	Para 5				
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„	xv	... ...		Bibliotheca	„	Biblotheca.
„	3	... „ 1 & 2	„	Macdonell	„	Macdonnel.
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„ 219	„ 21	...	„	effectual	„	offectual.
„ 221	item 3	...	„	Pācana	„	Pāchana.
„ 242	line 2	...	„	Parietes	„	Parietis.
„ 262	„ 10	...	„	Round...four cornered	„	four cornered.....round.
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„ 340	„ 5	...	„	Physician	„	Physian.
„ 346	„ 18	...	„	amber	„	ambar.
„ 348	„ 2	...	„	Paitamaha	„	Paitāmoha.
„ 352	„ 22	...	„	Firoz	„	Firroz.
„ 354	„ 11	...	„	Areca	„	Arecha.
„ 355	„ 12	...	„	Dvārusita	„	Davrusita.

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WORKS BY THE AUTHOR.

1. Muscles of the Human Body, arranged in Tabular forms. Fourth Edition. Re. 1

2. Tropical Abscess of the Liver.

Thesis approved for the degree of Doctorate in Medicine, Madras University. Rs. 5

3. Glossary of Indigenous Medicinal Plants.

(In the Press)

4. Notices, Biographical and Bibliographical, of the Indian Physicians and their Works on Medicine.

(In the Press)

5. Medicine in the Vedic times.

(In preparation)

THE STAR MEDICAL HALL,

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CALCUTTA.

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THE

Surgical Instruments of the Hindus.

CHAPTER I.

INTRODUCTION.

ANCIENT MEDICAL AUTHORS AND THEIR WORKS.

The Science and Art of Medicine, like many other different branches of learning originated with the Hindus. They consider the art of healing as an Upaveda and it is generally known as Āyurveda, that is the art of prologing life. Like the Vedas, they trace the origin of the science to God, the fountain of all true knowledge. Bramhā transmitted this heaven-born science to this world for benefit of the mortals in one of the sacred writings, the Āyurveda.

It was composed as a sub-division of the Atharva Veda and consisted originally of a *lākh slokas* or a hundred thousand stanzas, divided into a thousand chapters. Then considering the short span of life and inadequate intelligence of man, he divided the book into eight parts[1] as follows :—

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[1] तद्यथा ॥ शल्यं शालाक्यं कायचिकित्सा भूतविद्या कौमारभृत्यमगदतन्त्रम् रसायनतन्त्रं वाजीकरणतन्त्रमिति ॥

Suśruta Saṁhitā, I. i.

कायचिकित्सा शालाक्यं शल्यहर्तृकं विषगरवैरोधिकप्रशमनं भूतविद्या कौमारभृत्यकं रसायनानि वाजीकरणमिति।

Caraka Saṁhitā, I. xxx.

वेदौ ह्याथर्वणः स्वस्त्ययनबलिमङ्गलहोमनियमप्रायश्चित्तोपवासमन्त्रादिपरिग्रहात् चिकित्सां प्राह।

Ibid.

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1. Śalya Tantra or Major Surgery.
2. Śālākya Tantra or Surgery of parts above the Clavicles.
3. Kāya Cikitsā or Inner Medicine.
4. Bhūtvidyā or Demnology.
5. Kaumārabhṛtya or the Science of Pædiatrics.
6. Agada or Toxicology.
7. Rasāyana or Treatment to prolong life.
8. Vājikaraṇa or Treatment to stimulate the sexual power.

The book is no more available now, Suśruta being the authority for the above information.[1]

A different view is held by others, who trace the origin of Hindu Medicine in the verses of the Ṛgveda.[2]

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[1] इह खल्वायुर्व्वेदो नाम यदुपाङ्गमथर्व्ववेदस्यानुत्पादैव प्रजाः श्लोकशतसहस्रमध्यायसहस्रञ्च कृतवान् स्वयम्भूः। ततोऽल्पायुष्ट्वमल्पमेधस्त्वाद्यावलोक्य नराणां भूयोऽपि प्रणीतवान्॥

Suśruta Saṁhitā, I. i.

तत्र चैत् प्रष्टारः स्युः चतुर्णामृक्सामयजुरथर्व्ववेदानां कं वेदमुपदिशन्त्यायुर्व्वेदविदः। किमायुः कस्मादायुर्व्वेदः किञ्चायमायुर्व्वेदः शाश्वतोऽशाश्वत इति। कानि चास्याङ्गानि कथ्यायमध्येतव्यः किमर्थञ्चेति॥

तत्र भिषजा पृष्ठेनैवं चतुर्णामृक्सामयजुरथर्व्ववेदानाम् आत्मनोऽथर्व्ववेदे भक्तिरादेश्या।

Caraka Saṁhitā, I. xxx.

The origin of medical science, as quoted in the above passage of Caraka, does not however agree with the view expressed by the author in the Sūtra Sthāna, Ch. I. (See footnote 1. P. 4). In Ch. XXX, we find that an attempt had been made to make a compromise between the two views of Agniveśa and Suśruta. Evidently this was the work of a later redactor, possibly Dṛḍhavala.

न ह्यायुर्व्वेदस्याभूत्पत्तिरुपलभ्यते। अत्यन्तावबोधोपदेशाभ्यामेतद्द्वयमधिकृत्य उत्पत्तिमुपदिशन्त्येके स्वाभाविकत्वास्य लक्षणमधिकृत्य यदुक्तम् इह चाद्येचास्याये * * * ॥

Caraka Saṁhitā, I. xxx.

[2] ऋग्वेदस्यायुर्व्वेद उपवेदः।

Carana Vyūha by Vyāsa.

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ATHARVA VEDA.

"On examining the contents of the Atharva Veda more in detail, we find that the hostile charms it contains are directed largely against various diseases or the demons which are supposed to cause them. There are spells to cure fever (takmān), leprosy, jaundice, dropsy, scrofula, cough, ophthalmia, baldness, lack of vital power, fractures and wounds; the bite of snakes or injurious insects, and poison in general; mania and other ailments. These charms are accompanied by the employment of appropriate herbs. Hence the Atharva Veda is the oldest literary monument of Indian Medicine."[1] This Veda can not belong to a period later than 1000 B. C., but possibly earlier.[2] It exists in the recensions of two different schools. That of the Paippalāda is only known in manuscript, discovered by Prof. Buhler in Kashmir and described by Prof. Roth in his tract Der Atharva Veda in Kaschmir (1875). The printed text, edited by Roth and Whitney in Berlin 1856, gives the recension of the Śaunaka School.[3] It has been translated into English Prose by Whitney, 2 Vols.; into English verse by Griffith, 2 Vols., Benares, 1897, and with the omission of the unimportant

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[1] Mcdonnel's Sanskrit Literature, P. 196.

अथर्ववेदस्य * * * * चतुर्थ वेदत्वेऽपि प्रायेणाभिचारकर्मत्वादृत्विग्विद्यायामनुपयोगाच्चानिर्देशः। तथाहि ऋग्वेदेनैव होत्रं कुर्वन् यजुर्वेदेनाध्वर्यवं सामवेदेनौद्गात्रं यदेव चर्य्यं विद्याय सूक्तेन ब्रह्मत्वमितियुते त्रयीसम्पाद्यत्वं यज्ञानां ज्ञायते।

Kallūka Bhaṭṭa's Commentary on Manu Saṁhitā, Ch. III, Śloka I.

[2] On the date of Atharva Veda, see pp. CXL—CLXI, Prof. Lanman's Edition of Whitney's Transl.; Prof. Mcdonnel's Sanskrit Literature, pp. 185—201.

[3] Index Vervorum in the Journal of the Am. Or. Soc. Vol. XII.

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hymns, by Bloomfield[1] into English Prose, with notes, in Vol. XLIII of the Sacred Books of the East.

CARAKA SAṀHITĀ.

In the Caraka Saṁhitā we find that Brahmā taught Dakṣa the science of medicine; Dakṣa became the preceptor of the Aśvin twins; they in their turn became the teachers of Indra and Indra imparted this knowledge to Bharadvāja who was sent by a conclave of sages to learn the art for the welfare of the human race.[2] Bharadvāja had Punarvasu Ātreya and the others as disciples. Ātreya's students were Agniveśa, Bhela, Jatukarṇa, Parāśara, Hārīta and Kṣārapaṇi, all of whom became celebrated as the authors of treatises on Medicine; the Caraka Saṁhitā being a revised and improved edition of the treatise of Agniveśa, which was declared to be the best production.[3] Caraka did not, however, redact the whole

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[1] He has also edited the Kauśika Sūtra of the Atharva Veda, with extracts from the commentaries of Dārita and Keśava (see Vol. XIV Journ. Am. Orient. Soc.). It is very useful as a help to the proper understanding of the meaning of a hymn.

[2] दीर्घञ्जीवितमखिच्छन् भरद्वाज उपागमत् ।
इन्द्रमुग्रतपा बुद्धा शरण्यममरेश्वरम् ॥
ब्रह्मणा हि यथा प्रोक्तमायुर्व्वेदं प्रजापतिः ।
जग्राह निखिलेनादावश्विनौ तु पुनस्ततः ॥
अश्विभ्यां भगवान् शक्रः प्रतिपेदे ह केवलम् ।
ऋषिप्रोक्तो भरद्वाजस्तस्माच्छक्रमुपागमत् ॥

Caraka Saṁhitā, I. i.

[3] अथ मैत्रीपरः पुण्यमायुर्व्वेदं पुनर्व्वसुः ।
शिष्येभ्यो दत्तवान् षड्भ्यः सर्व्वभूतानुकम्पया ॥
अग्निवेशश्च भेलश्च जतुकर्णः पराशरः ।
हारीतः क्षारपाणिश्च जगृहुस्तमुनेर्वचः ॥
बुद्धेर्विशेषस्तत्रासीन्नोपदेशान्तरं मुनेः ।
तन्त्रस्य कर्त्ता प्रथममग्निवेशो यतोऽभवत् ॥
अथ भेलादयश्चक्रु स्वं स्वं तन्त्रं कृतानि च ।
श्रावयामासुरात्रेयं सर्षिसङ्घं सुमेधसः ॥

Ibid, I. i.

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book;—the last forty-four chapters[1] were edited by Dṛḍhavala,[2] a native of Panchanadapura, long supposed to refer to Punjab (the land of five rivers) but at present identified with a town in Kashmir by Dr. Hoernle.[3] Two other works, the treatises of Bhela and Hārīta, are still extant; the former existing in manuscript in the Tanjore Library[4] and the latter as printed texts by *Kavirājes* K. C. Sen and B. L. Sen, of Calcutta.[5]

Now as regards the age of Caraka, there is great divergence of opinions. The Indians generally believe him to be a Ṛṣi of great antiquity while the European scholars try

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[1] For a discussion on the part added by Dṛḍhavala, see Hoernle's Studies in Ancient Indian Medicine, J. R. A. S. 1908, P. 997-1002. Also see pp. 11-15 in the Vanauṣadhi Darpaṇa, Vol. I., by Kavirāja Birajā Charan Gupta, 1908.

[2] अतस्तन्त्रोत्तममिदं चरकेणातिबुद्धिना ।
संस्कृतं तत् तु संक्षिप्तं विभागेनोपलक्ष्यते ॥
इदमन्यूनशब्दार्थं तन्त्रं दीर्घविवर्जितं ।
अखण्डार्थं दृढबलो जातः पञ्चनदे पुरे ॥
कृत्वा बहुभ्यस्तन्त्रेभ्यो विशेषाच्च बलीयसम् ।
सप्तदशीषधाध्यायसिद्धिकल्पैरपूरयत् ॥

Caraka Saṁhitā, VIII, xii.

अस्मिन् सप्तदशाध्यायाः कल्पाः सिद्धय एव च ।
नासाद्यन्तेऽग्निवेशस्य तन्त्रे चरकसंस्कृते ॥
तानेतान् कापिलबलः शेषान् दृढबलोऽकरोत् ।
तन्त्रस्यास्य महार्थस्य पूरणार्थं यथातथम् ॥

Ibid, VI, xxx.

[3] Hoernle's Studies in the Medicine of Ancient India, Part I, Osteology, Introduction, p. 2. See also his article on "The authorship of Caraka Saṁhitā" in the *Archiv für die Geschichte der Medizin*, 1907.

[4] See Burnell's Tanjore Catalogue No. 10773 of Sanskrit Mss., P. 63.

[5] It is doubtful whether the Hārīta Saṁhitā is the genuine work of the Ṛṣi, Hārīta. The printed text refers to Caraka, Suśruta and even Vāgbhaṭa, who were decidely posterior to Harita, See the Footnote 3, P. 6.

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to connect him with historical events of more modern times. Sylvain Lévi has recently discovered in the Chinese Translation of the Buddhist *Tripiṭaka* that Caraka was the Court Physician of the Indo-Scythian King Kaniṣka, in the first century A.D.[1] But the following objections are to be met with before his conclusions can be accepted as proved :—

1. The age of Kaniṣka is not yet settled, the probable limits of his reign being from the first century B. C. to the second century A. D.[2] Moreover in the Buddhist *Tripiṭaka* referred to, the name of Caraka is simply mentioned as the Court Physician of the King Kaniṣka but there is nothing to identify him with the author of the book. The same name, found in different places, does by no means signify the same person.

2. The time assigned to Caraka by the Indian medical tradition is of great antiquity. With regard to the chronological position of the three old authors, he is mentioned as anterior to Suśruta and Vāgbhaṭa I.[3]

3. Dr. Rāy has pointed out that the name Caraka is patronymic in the Veda.[4] It is quite possible that a much

[1] See Journal Asiatique—July to December 1896, p. 444 to 484 and January to June 1897, p. 5 to 42 ; also Indian Antiquary Vol. XXXII, 1903, p. 382 and Viena Oriental Journal, Vol. XI., p. 164.

[2] See V. A. Smith's Early History of India, P. 225-26.
Dr. Fleet in J. R. A. S., 1906, P. 979.
Dr. Bhandarkar in J. R. A. S. (Bombay Branch), Vol. XX, P. 269.
J. A. S. B. Vol. XXXIX, 1870, p. 65 and 126.

[3] चरक: सुश्रुतश्चैव वागभटश्च तथापर:।
मुख्याश्च संहिता वाच्यास्त्रिष्व एव युगे युगे ॥
अत्रि: कृतयुगे वैद्यो द्वापरे सुश्रुतो मत:।
कलौ वागभटनामा च गरिमाच प्रदृश्यते।
Hārita Saṁhitā, Pariśiṣṭādhāya.

[4] Dr. P. C. Rāy's History of Hindu Chemistry, Introduction, P. X.

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later namesake of his, is referred to by the *Tripiṭaka*, just as we know that more than one Vāgbhaṭa appeared as successful physician. Again we have evidence that eminent physicians in later times were called Caraka by way of a compliment and so Vāgbhaṭa was called Caraka of Sindh or Sindhicara.

4. Pāṇini wrote special Sūtras for the Agniveśas and the Carakas.[1] These names must have been famous before Pāṇini's time, otherwise he would not have written special Sūtras for them. Prof. Goldstucker has conclusively proved that Pāṇini could not have flourished later than the sixth century B. C.[2]

5. Patañjali wrote a commentary on Caraka.[3] He flourished during the second century B. C. Both Cakrapāṇidatta and Bhoja allude to him as the redactor of Caraka Saṁhitā.[4] So Caraka must have flourished long before him, for unless his work was regarded as a standard work of authority, Patañjali would not have taken so much pains to write notes on the book, and still more for issuing a redaction.

6. The internal evidence of the book itself speaks against such an assumption. There is no salutation to any diety at the

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[1] कटचरकाच्छ्रुक । Pāṇini 4. 3. 107.

गर्गादिभ्यो यञ् ॥ Ibid, 4. 1. 105.

गर्ग । वत्स । * * * * अग्निवेश * * * * पराशर । जतुकर्ण । * * *.

[2] Goldstucker's Pāṇini; and Journal of the Asiatic Society of Bengal, Vol. XLII, P. 254.

[3] आप्तानाम् अनुभवेन वस्तुतत्त्वस्य कात्स्न्येन निश्चयवान्, रागादिवशादपि नान्यथावादी यः स इति चरके पतञ्जलिः ।

Quoted in Laghumañjuṣā of Nāgeśa Bhaṭṭa (Rāy).

[4] पातञ्जल—महाभाष्य—चरकप्रतिसंस्कृतैः ।

मनोवाक्-कायदोषाणाम् हर्त्रेऽहिपतये नमः ॥

Vide salutation in the Āyurvedārthadīpikā.

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beginning of the book,—a custom invariably found to be observed in the more modern compilations. There is complete absence of Paurāṇic theology in the Caraka Saṁhitā, nor is there any reference to Śākya Muni and his religion. Kaniṣka was a great patron of Buddhism, and it might naturally be expected from the Court Physician of the king to describe the charitable hospitals which we know from the edict of Aśoka, to have flourished in every quarter of India. On the contrary we find descriptions of a hospital as reserved for rich men only at their own houses. Those gods and godesses that figure so prominently in the Purāṇas were unknown during his time.[1] Beef was not then, apparently, a

[1] No doubt the names of Lakṣmī, Kṛṣṇa and Vāsudeva occur in Cikitsita Sthānam, Chapter XXV, but it should be remembered that they occur in the Supplement added by Dṛḍhavala in later times.

सर्व्वग्रहा न तत्र प्रभवन्ति न चाग्निशस्त्रनृपचौराः ।
लक्ष्मीश्च तत्र भजते यत्र महागन्धहस्त्यस्ति ॥
पिप्पलाद इमञ्चाह सिद्धं मन्त्रमुदीरयेत् ।
मम माता जया नाम विजयी नाम मे पिता ॥
सोऽहं जयो जयापुत्रो विजयोऽथ जयामि च ।
नमः पुरुषसिंहाय विष्णवे विश्वकर्म्मणे ॥
सनातनाय कृष्णाय भवाय विभवाय च ।
तेजो वृषाकपेः साक्षात् तेजो ब्रह्मेन्द्रयोर्यमे ॥
यथाहं नाभिजानामि वासुदेवपराजयम् ।

Caraka Saṁhitā, VI, xxv.

But Kṛṣṇa and Vāsudeva are mentioned in Pāṇini as demigods, having many adherents who formed a class. "वासुदेवार्जुनाभ्यां वुन्" Pāṇini, 4. 3. 98. Again the passage may be an interpolation of a subsequent *Vaiṣnaba Vaid.*

So Bṛṣavadhvaja is also mentioned in Dṛḍhavala's Supplement, as a god to be worshipped during the preparation of some medicines :

ब्रह्मघोषशङ्खपटहभेरीनिनादैः सिद्धं सितच्छत्रचक्रतल्पायं भजस्कन्धमारोपयेद्भगवन्तं वृषध्वजमभिपूज्य तं खेहं विभागमाचिक्रमङ्खाशीःस्तुतिदेवतार्च्चनैर्वेश्मं गमयेत् ॥

Ibid, VIII, xii.

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forbidden food, for it is spoken of as an article of diet that should not be indulged daily,[1] nor should it be used in excessive quantity as it is mentioned as a cause of the disease, Vāta-Rakta.[2]

The style of the book is antiquated and decidedly savours that of the Brāhmaṇas. Nāya and Vaiśeṣiki systems occur in the text,[3] and so probably the book was written long before the compilation of these Sūtras.

Editions.—The book had undergone several editions. It was edited by Jībānanda Vidyāsāgar, Calcutta, in 1877 and 1896 (2nd Ed.); by Gaṅgādhar Kaviratna, Berhampur, 1879; by Gupta, Calcutta, 1897; with commentary by Cakrapāṇidatta, Calcutta, 1892-93; by Jaśodānandana Sarkār, with Bengali translation, 1894.

Translations.—It had been translated into English by A. C. Kaviratna, Calcutta, 1897. Caraka was translated from Sanskrit

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And we find that the antidote to poisen called महागन्धहस्ती is said to have been told by Tryambaka (Śiva) to Baiśravaṇa (Kuvera):

अगदोऽयं वैश्रवणाख्यातन्त्र्यम्बकेण षष्ट्यङ्गः ।

Caraka Saṁhitā, VI. xxv.

Also we find the name of Kārttikeya mentioned in Sec. IV. ch. viii.

प्रसुव त्वमविक्लिष्टमविक्लिष्टा शुभानने,
कार्त्तिकेयद्युतिं पुत्रं कार्त्तिकेयाभिरक्षितमिति ॥

[1] कुर्च्चिकांश्च किलाटांश्च शौकरं गव्यमामिषं ।
मत्स्यान् दधि च माषांश्च यावकांश्च न शीलयेत् ॥

Ibid, I. v.

[2] कुलत्थमाषनिष्पावशाकादिपललेक्षुभिः ।
दध्यारनालसौवीरशुक्रतक्रसुरासवैः ॥

Ibid, VI. xxix.

[3] Vide Caraka, III. viii.

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into Arabic in the beginning of the eighth century and his name "Sharaka Indianus" occurs in the Latin translations of Avicenna, Rhazes and Serapion. "A translation of the Karaka[1] from Sanskrit into Persian and from Persian into Arabic is mentioned in the Fihrst, (Finished 987 A.D.). It is likewise mentioned by Albērūnī[2]; the translation is said to have been made for the Barmekides."[3] Albērūnī's chief source on Medicine was "Caraka, in the Arabic Edition of Ali Ibn Zain, from Trabaristan."[4]

Commentaries.—

1. Patañjali—2nd century B.C.—not available.
2. Cakrapāṇidatta's Caraka Tātparya Tīkā, or Āyurveda-dīpikā[5]—1060 A.D.
3. Haricandra[6]—1111 A.D.—not available.
4. Śibadāsa's Caraka-Tattva-Pradīpikā.
5. Gaṅgādhar's Jalpa-Kalpa-Taru—1879 A.D.

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[1] Proceedings of the As. Soc., Bengal, 1870, September.

[2] Reinaud, *Memoire sur l'Inde*, P. 316.

[3] Maxmuller's Science of Language, Vol. I., P. 168, Foot Note.

[4] Sachau's preface to India, P. XL.

[5] See Caraka Saṁhitā with Cakrapāṇidatta's Commentary by *Kavirāja* Harināth Viśārada, Calcutta, 1895.

[6] A Commentary written by Haricandra is referred to in the Sanskrit Ślokas narrating the geneology of Maheśvara, the author of Viśvaprakāśa and Sāhasāṅkacarita, who flourished during the reign of Sāhasāṅka, king of Gazipur in 1033 Saka (1111 A. D. Wilson).

श्रीसाहसाङ्कनृपतेरवद्यविद्य-
वैदग्धीतरङ्ग पदपद्धतिमेव विभ्रत्।
यश्चन्द्रचारुचरितो हरिचन्द्रनामा
सद्याख्यया चरकतत्त्वमलंचकार ॥

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SUŚRUTA SAṀHITĀ.

The next treatise on Hindu Medicine is the Suśruta Saṁhitā. Suśruta was the son of the sage Viśvāmitra,[1] a contemporary of Rāma. He learned the Science of Medicine from Divodāsa, surnamed Dhanvantari, king of Benares, at his Himalayan retreat. According to Suśruta, Divodāsa was the incarnation of Dhanvantari, the celebrated physician of the gods in heaven, and he first propounded the Art of Healing in this world.[2] Suśruta represented the Surgical School while Caraka was pre-eminently a Physician in practice.

As regards the authorship of the book, opinions differ. To Suśruta, Dhanvantari addressed his lectures on Major Surgery,[3]

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[1] Mahābhārata, Anuśāṣana Parva, Ch. 139, Vs. 8-11.

धन्वन्तरिर्धर्म्मभृतां वरिष्ठो वाग्विशारदः ।
विश्वामित्रात्मजमृषिं शिष्यं सुश्रुतमखशात् ॥

Suśruta Saṁhitā, V. ii.

अष्टाङ्गयर्व्वेदविदं दिवोदासं महामतिं ।
छिन्नशास्त्रार्थसन्देहं सूक्ष्मागाधमिवोदधिं ।
विश्वामित्रसुतः श्रीमान् सुश्रुतः परिपृच्छति ।

Ibid, VI. lxvi.

सर्व्वशास्त्रार्थतत्त्वज्ञ स्तपोदृष्टि रुदारधीः ।
वैश्वामित्रं शशासाथ शिष्यं काशिपतिर्म्मुनिः ॥

Ibid, VI. xxviii.

[2] अथ खलु भगवन्तममरवरमृषिगणपरिवृतमाश्रमस्थं काशिराजं दिवोदासं धन्वन्तरिमौपधेनववैतरणौरभ्रपौष्कालावतकरवीर्य्यगोपुररक्षितसुश्रुतप्रभृतय ऊचुः ।

Ibid, I. i.

[3] अत्र कस्मै किमुच्यतामिति । त ऊचुः । अस्माकं सर्व्वेषामेव शल्यज्ञानमूलं कृत्वोपदिशतु भगवानिति । स उवाचैवमस्त्विति । .....अस्माकमेकमतीनां मतमभिसमीक्ष्य सुश्रुतो भगवन्तं प्रक्ष्यति ।

Ibid, I. i.

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which he reproduced in this work. But in the opening lines of the book, salutation is offered to Brahmā, Dakṣa, Aśvins, Indra, Dhanvantari, Suśruta and others.[1] This shows that Suśruta can not be the author of the work or at least of the work in its present shape, for no author can offer salutation to himself. By "the others" are no doubt meant the notable surgeons who practised and taught the Science of Surgery and who were either contemporary with or posterior to Suśruta. Possibly the original Suśruta Saṁhitā had been recast and the redactor could appropriately offer a salutation to the original author and to other surgeons who flourished before him. There is also an Indian medical tradition, noted in Dallaṇacārya's Commentary, which assigns the improved and supplemented edition of Suśruta's original work to Nāgārjjūna,[2] the celebrated Buddhist Chemist, who is said to have been a contemporary of the king Sātvāhana.[3]

In the third chapter, Suśruta enumerates the subjects described by him,—the chapter forming an index of the book. Therein he mentions the five principal divisions of his book and says that the Uttara Tantra or the Supplement would be

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[1] नमो ब्रह्मप्रजापत्यश्विवज्रभिइन्द्वन्तरिसुश्रुतप्रभृतिभ्यः ।

Suśruta Saṁhitā, I.

[2] यत्र यत्र परोक्षे निर्योगस्तत्र तत्रैव प्रतिसंस्कर्त्तृसूत्रं ज्ञातव्यमिति । प्रतिसंस्कर्त्तापीह नागार्জ্জুन एव ।

Dallaṇa's Commentary to Suśruta, I. i.

See also Dr. Cordier's Recentes Decouvertes, pp. 12-13.

[3] See Harṣacarita by Vāṇa.
Beal's *Buddhist Rocords of the Western World*, Vol II., P. 209, 212, 216.
Burgess' Archœological Survey of S. India.
Introd. a l'histoire du Budh. Ind., P. 508.

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described afterwards.[1] Now the fact that the sixth part was appended to the work as a Supplement or Uttara Tantra (*i.e.*, after treatise) clearly shows that it was written afterwards by another surgeon and added to the original treatise. If the original Suśruta wished to have six divisions of his book, he would have mentioned it clearly in the index and would not have, after stating that his book consisted of five parts, added that "the Supplement would be described afterwards,"[2] which seems to be an interpolation of the Supplementor to pass his edition as the orginal work of the author. Again at the end of the fifth section, there is a passage describing the importantce of the Āyurveda, which was meant as the conclusion of the book by the author.[3] It is to be noted

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[1] प्रागभिहितं सविंशमध्यायशतं पञ्चसु स्थानेषु। तत्र सूत्रस्थानमध्यायाः षट्चत्वारिंशत्। षोड़श निदानानि। दश शारीराणि। चत्वारिंशच्चिकित्सितानि। अष्टौ कल्पाः। तदुत्तरं षट्षष्टिः।

अध्यायानां शतं विंशमेवमेतदुदीरितम्।
अतःपरं खनाम्नैव तन्त्रमुत्तरमुच्यते॥

Suśruta Saṁhitā, I. iii.

[2] बीजं चिकित्सितमेतत् समासेन प्रकीर्त्तितम्।
सविंशमध्यायशतमस्य व्याख्या भविष्यति॥

तत्र सविंशमध्यायशतं पञ्चसु स्थानेषु। तत्र सूत्रस्थाननिदानशारीरचिकित्सितकल्पेष्वर्थवशात् संविभज्योत्तरे तन्त्रे शेषानर्थान् व्याख्यास्यामः।

Ibid, I. i.

[3] सविंशमध्यायशतमेतदुक्तं विभागशः।
इहोद्दिष्टाननिर्द्दिष्टान्सर्व्वान् वक्ष्यामथोत्तरे॥
सनातनत्वाद्देहानामचरत्वात्तथैव च॥
तथा दृष्टफलत्वाच्च हितत्वादपि देहिनां।
वाक्समूहार्थविस्तारात् पूजितत्वाच्च देहिभिः॥
चिकित्सितात्पुरुषतः न किञ्चिदपि सुश्रुत।
ऋषेरिन्द्रप्रभावस्यास्मृतयोनेर्भिषग्गुरोः॥
धारयित्वा तु विमलं मतम् परमसम्मतं।
उक्ताहार समाचारईह प्रेत्य च मोदते॥

Ibid, V. viii.

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that at the end of no other sections do we find a similar passage. He also writes: "Thus one hundred and twenty chapters are described" but adds: "The other diseases shall be described in the Uttara Tantra": the latter part no doubt is an interpolation of the Supplementor. Moreover, in the opening lines which serve as a preface to the sixth part, the authority quoted for the diseases of the eye is Nimi, the king Janaka of Mithilā and not Dhanvantari.[1] But in the first chapter of the first section, it is described that the sages wanted Dhanvantari to teach them Śalyatantra or Major Surgery only and he consented to their request. And this subject he treated in detail in the five sections of the book. In the Supplement, on the other hand, are described the other branches of the science such as Minor Surgery, Inner Medicine, &c. Probably this part was added afterwards to give completeness to the treatise; and the original Suśruta was called Vṛddhya or the Old by the commentators to distinguish him from the Supplementor.

Suśruta's work is specially important to us as having two whole chapters (vii and viii of Section I.) devoted to the descriptions of Surgical Instruments and one whole chapter (xxv of Section I.) to the principles of Surgical Operations.

The age of Suśruta is also involved in obscurity. Nothing can be ascertained from the fact that he was a son of Viśvāmitra[2],

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[1] अध्यायानां शते विंशे यदुक्तमसकृन्मया।
वक्ष्यामि बहुधा सम्यगुत्तरैरर्थनिमानिति ॥
इदानीन्तत् प्रवक्ष्यामि तन्त्रमुत्तरमुत्तमं।
निखिलेनोपदिश्यन्ते यत्र रोगाः पृथग्विधाः ॥
शालाक्यशास्त्राभिहिता विदेहाधिपकीर्त्तिताः ॥

Suśruta Saṁhitā, VI. i.

[2] Viśvāmitra is the *gotra* name; so the simple name may either refer to the great Viśvāmitra or to his descendants.

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for the age in which the latter lived is not known to us. But he must have flourished during the Vedic Age as many Vedic Hymns are ascribed to him. In the Mahābhārata, Suśruta is mentioned as one of the sons of Viśvāmitra[1] and in the Suśruta Saṁhitā the author is often described as his son. The age of the great epic has, with good reasons, been fixed at 1000 B.C. So Suśruta must have flourished much earlier. The latest limit which we can assign to Suśruta is 600 B.C. as "there are indications in the *Śatapatha Brāhmaṇa*, a secondary Vedic work, that the author of it was acquainted with the doctrines of Suśruta" as regards the Osteology. "The exact date of that work is not known, but it is with good reason referred to the sixth century B.C." Again in the Atharva Veda, in the tenth book, there is a hymn on the creation of man in which the skeleton is described according to Ātreya and Suśruta.[2] "The large portion of it (Books I to XVIII) indeed admittedly belongs to a much earlier period, possibly as early as about 1000 B.C.; and the hymn in question is included in this older portion"[3]. This shows that Suśruta could not have flourished later than 1000 B.C.

Again in Hastī-Āyurveda, a book on the Treatment of

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[1] श्यामायनीऽथ गार्ग्यश्च जावलिसुश्रुतस्तथा—

* * * * * *

विश्वामित्रात्मजाः सर्व्वे मुनयो ब्रह्मवादिनः ॥

Mahābhārata, Anuśāsana Parva, Ch. IV.

[2] See J. R. A. S., 1906, P. 915; 1907, P. 1.

[3] Hoernle's Studies in the Medicine of Ancient India, Part I. Osteology, Introduction, P. 9.

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Elephants by Pālakāpya, we find the Surgical instruments described after the manner of Suśruta. Pālakāpya lived as a Veterinary Surgeon in the Court of Romapāda, King of Aṅga, which had as its capital the famous town of Campā, identified with the modern town of Bhāgalpur. King Romapāda was contemporary with king Daśaratha, the father of Rāma, the hero of Rāmāyana.[1] Here we have a corroborative evidence of the age of Suśruta.

Suśruta is mentioned in the *Vārttikas* of Kātyāyana[2] who flourished during the fourth century B.C.

We have alluded to Nāgārjjūna,[3] the Buddhist Chemist, as the redactor of the Suśruta Saṁhitā. He is said to have been a contemporary of king Kaniṣka that is about the first century B.C.

Another revision was undertaken by Candraṭe, the son of Tīsaṭa, the author of Cikitsā-kalikā. He revised the text which must have fallen then into a state of corruption. The probable date of Candraṭe is the ninth century A.D.[4]

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[1] ऋग्निं शुश्रुषमाणस्य पितरं च यशस्विनम्।
एतच्छ्रुत्वावकाले तु रोमपाद प्रतापवान्।
Rāmāyana, Vālakāndam, Ch. IX.

See also Rāmāyana, i, 11, 13-20; Mahābhārat, iii, 110, 10008-9; Bhāgavat, ix, 2.3, 7-10.

[2] सुश्रुतेन प्रोक्तं सौश्रुतं।

[3] Possibly more than one Nāgārjjūna appeared in ancient India as a chemist. Alberūnī says: "He lived nearly a hundred years before our time" (India, I. P, 189). Rājtarañginī places him in the 3rd century B.C. (I. Vs. 172-173). The modern scholars are of opinion that the founder of the Mahāyāna system lived in the first century A.D.

[4] Hoernle's Osteology, p. 100.

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There is no doubt of the tradition that Suśruta's work was redacted, for the author could not write such a passage as follows: "The surgical treatises of Aupadhenava, Aurabhra, Suśruta and Pouṣkalāvata from the basis of other treatises on the subject."[1]

Commentators.[2]—

1. Cakrapāṇidatta—Vānumati—1060 A.D.
2. Gayadāsa—{Nyāya Candrikā or Pañjikā}—11th century A.D.
3. Jejjaṭācāryya.
4. Bhāskara.
5. Mādhava.
6. Bramhadeva.
7. Dallaṇācāryya—Nibandha Saṁgraha—12th century A.D.
8. Ubhalta (Kashmir).

Editions.—Suśruta Saṁhitā has been edited by Madhusūdan Gupta, Calcutta, 1835; by J. Vidyāsāgar, 3rd Edition, Calcutta, 1889; by A. C. Kaviratna, Calcutta, 1888-95; by Prubhurām Jībanarām, Bombay, 1901; and by Vīrasvāmī, Madras.

This book has been translated into English in part only by U. C. Datta 1883, A. Chaṭṭopādhyāy 1891, Hoernle 1897, Calcutta, in the Bibliotheca Indica. It has been translated into Latin by Hessler and into German by Vullurs.

The book was translated into Arabic before the end of the eighth century A.D. It is called "Kitab-Shawshoon-al-Hindi"

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1 औपधेनवमौरभ्रं सौश्रुतं पौष्कलावतम्।
शेषाणां श्रुत्यतन्त्राणां मूलान्येतानि निर्दिशेत्॥
Suśruta Saṁhitā, I. iv.

2 * * * * श्रीसहनपालदेवनृपतिवल्लभः श्रीडल्लणः समभूत्। तेन श्रीजेज्जटं टीकाकारं श्रीगयदासभाष्करौ च पञ्जिकाकारौ श्रीमाधवब्रह्मदेवादीन् टीपनककारांश्चोपजीव्यायुर्व्वेदशास्त्र सुश्रुतव्याख्यानाय निबन्धसंग्रहः क्रियते।
Dallaṇa's Commentary, I. i.

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and also mentioned as "Kitab-i-Susrud" or Book Suśruta by Ibn Abillsaibial. Rhazes often quotes Sarad as an authority in Surgery.[1]

VĀGBHATA I.

The next author of celebrity and whose work is still extant is Vāgbhaṭa I or Vāgbhaṭa the elder, the author of Aṣṭāṅga Saṁgraha (*i.e.*, Compilation of the Octopartrite Science). In later times, a namesake of his, wrote another work called Aṣṭāṅga Hṛdaya Saṁhitā (or the best Compendium *i.e.*, the Heart of the Octopartrite Science). In the Uttara Sthāna, Vāgbhaṭa the younger distinctly states that his Compendium is based on the Compilation of Vāgbhaṭa the elder.[2]

As regards the age of Vāgbhaṭa the elder, there is the same uncertainty as with his predecessors. We are however sure that he is posterior to Caraka and Suśruta for he refers to these writers by name.[3]

The chronological relation of the three early authors is described in a popular couplet that Ātreya, Suśruta and Vāgbhaṭa were the three great medical authors for the three Yugas—

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[1] "His next description is from an author named Sarad, whom he frequently quotes in other parts of his works".

Adam's Commentary on Paulus Æginetta, VI. lxi.

[2] अष्टाङ्गवैद्यकमहोदधिमन्थनेन योऽष्टाङ्गसंग्रहमहामृततरान्निरास ।
तस्मादनल्पफलमल्पसमुद्यमार्थं प्रीत्यर्थमेतदुदितं पृथगेव तन्त्रम् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, Uttara Sthāna, Ch. XL, v. 82.

[3] By name, *e g.* in Saṁgraha, Bombay ed., Vol. I, P. 246; Vol. II, P. 421. Again quoted from Caraka, *Ibid.*, Vol. I, pp. 20, 93; Vol. II, pp. 212, 213, *et passim*; from Suśruta I, *ibid*, Vol. I. pp. 109, 121, 177, 247; Vol. II, p. 303, *et passim*. (Hoernle).

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the Tretā, Dvāpara and Kali, respectively.[1] They are known as the Vṛddha Trayī or the Old Triad. This medical tradition goes much against the conclusion of Dr. Hoernle that Vāgbhaṭa I must have flourished early in the seventh century A.D. One of the reasons put forward by him is the fact, that "the Buddhist pilgrim I'Tsing, who resided ten years in the Nalandā University (in Bihar) from about 675-686 A.D., states in *Records of Buddhist practices* that the eight arts (*i.e.*, the branches of medicine) formerly existed in eight books but lately a man epitomised them and made them on one bundle (or book)."[2] Professor Jolly understands by it the Suśruta Saṁhitā while Dr. Hoernle points out with more reasons that it refers to Vāgbhaṭa I's work, the Aṣṭāṅga Saṁgraha (*i.e.*, the Compilation of the Octopartrite Science) and rules out Suśruta by the word "lately."[3] But the description that I'Tsing gives of the contents of the book does not warrant any reference to either. Moreover, he has not given any reason why Vāgbhaṭa II's book Aṣṭāṅga Hṛdaya Saṁhitā (the best Compendium of the Octopartrite Science) might not be alluded to by I'Tsing. Dr. Hoernle, however, rules him out by date for "he can not be placed earlier than the eightth century"—an assertion unsupported by any evidence whatsoever. All that he has proved is that "Accordingly it is probable that all these three medical writers (Mādhava, Dṛḍhabala and Vāgbhaṭa II) come in the period from the 7th to the

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[1] See foot-note 3, P. 6.

[2] I'Tsing: Records of the Buddhist Religion. Transl. by Professor Takakusu, P. 128.

[3] J. R. A. S., 1907, P. 413.

Hoernle's Osteology, Introduction, P. 10—11.

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9th century A.D.[1] at no very great interval from one another," and this proof is based on the age of Vāgbhaṭa I as suggested by I'Tsing's remarks. Thus he has taken for granted what he is required to prove. He has shown that Susruta is anterior to Vāgbhaṭa I; and Vāgbhaṭa II is posterior to him. But in trying to prove that Vāgbhaṭa I lived in the seventh century he cannot assume that Vāgbhaṭa II lived in the eighth. Another evidence adduced in support of his conclusion is the fact that the non-medical version of the list of bones of the human body as contained in the Law-book of Yājñavalkya presupposes earlier uncorrupted forms of lists of bones both in Caraka and Suśruta, and "the corrupt recension, traditionally handed down, must have come into existence at a later date," that is to say, between the date of Yājñavalkya (350 A.D.) and Vāgbhaṭa I, the latter of whom is proved to have copied from the corrupt recensions of Caraka and Suśruta. Thus the older recensions still existed in the fourth century A.D. and if we add to it the interval of time necessary for the texts to have fallen into a state of corruption, we get the early seventh century A.D. for Vāgbhaṭa I. But we must remember that there is nothing to prevent against the supposition that Vāgbhaṭa I lived before Yājñavalkya. There might have been two recensions of the texts available during Yājñavalkya's time, one corrupted and it might or might not have been the work of Vāgbhaṭa I and another true version which was availed of by the sage Yājñavalkya. And similar events have happened, as has been pointed out by Dr. Hoernle himself, in our own generation. Gaṅgādhar's recension of Caraka is a corrupted form of the text,

[1] *Ibid*, P. 16.

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while the recension given in Jībānanda's edition is the traditional text of Caraka. No critic would I think jump into the conclusion that Gaṅgādhar lived three or four centuries after Jībānanda. Again if it be true, as he contends, that Suśruta was redacted by Vāgbhaṭa I, we could easily imagine that Yājñavalkya copied his list bones from the original Suśruta and not from the redaction of Vāgbhaṭa I. So we see that the age assigned to Vāgbhaṭa I, or the seventh century A.D. can not be accepted as proved. Dr. Hoernle says : "It should, however, be understood that these conclusions regarding the date and authorship of Vāgbhaṭa I, are not put forward as established fact."

Let us recapitulate the objections that can be urged against the conclusion that Vāgbhaṭa I lived in the seventh century A.D.

1. Vāgbhaṭa I is believed by the Indian medical men to have flourished long before the Christian era. By some, he is connected with the court of Yudhiṣṭhira, but his name is nowhere mentioned in the Mahābhārata. Ātreya, Suśruta and Vāgbhaṭa are described as the Old Triad or Vṛddhya Trayī and they were the authorities for the Tretā, Dvāpara and Kali Yugas, respectively. It is curious to observe that Dr. Hoernle in arguing against the conclusion of Prof. Jolly that Suśruta is meant by I'Tsing, takes advantage of this Indian medical tradition that Suśruta flourished during pre-historic times, but does not mention the same tradition with regard to Vāgbhaṭa I, which goes against his own conclusion. On the other hand the same objection does not apply against Vāgbhaṭa II.

2. The name of Vāgbhaṭa, I's book, Compendium of the

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Octopartrite Science, no doubt, agrees very well with the description of I'Tsing that "lately a man collected them into one bundle." But Vāgbhaṭa II's book "The best Compendium of the Octopartrite Science" is equally suggestive, though Dr. Hoernle says: "it cannot prevail by the side of the more suggestive name of the rival work of Vāgbhaṭa the elder."

3. Again in arguing against Prof. Jolly, Dr. Hoernle has attached much importance to the word "lately" by which Suśruta is ruled out by date. Admitting the validity of such reasoning, it does not follow that by the word "lately" I'Tsing meant any contemporary author or any one who preceded him by a short period only. To comprehend the meaning of the sentence we must understand the word "lately" in connection with the word "formerly" used before.[1] Now the sentence "The science of medicine formerly existed in eight books" no doubt refers to the division of Āyurveda into eight parts by Brahmā and to the treatises on the different branches of Medicine by Agniveśa, Suśruta and others. These treatises are believed to be of remote antiquity, and so any later compilation may be spoken of as recent in comparision with the old treatises of unknown ages. Thus the word "lately" may refer either to Vāgbhaṭa I or Vāgbhaṭa II, but the latter author's claim to the honour becomes reasonable considering his decided posteriority to the former and so coming within the limit of the time suggested by the word "lately."

4. Again I'Tsing refers to a book which was recognised as the standard throughout India. This may refer either to

[1] J. R. A. S. 1907. P. 174.

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Vāgbhaṭa I or II. But if Vāgbhaṭa I's book occupied such a position at the time of I'Tsing, it becomes difficult to imagine why Vāgbhaṭa II should write another work principally based on the work of Vāgbhaṭa I after a lapse of a century or so. Moreover, we find at the present time, that Vāgbhaṭa II's book, Aṣṭāṅga Hṛdaya Saṁhitā, has a wider popularity than the book Astāṅga Saṁgraha of Vāgbhaṭa I. The former has been printed many times and is widely read by the students,—so much so Vāgbhaṭa is generally known as the author of Aṣṭāṅga Hṛdaya Saṁhitā.

5. Moreover, the Arabian physician Rhazes, who is said to have lived in the ninth century (882 A.D.) in treating of the property of ginger, the common plantain or musa and other drugs, quotes from an Indian writer, whom he calls Sindaxar or Sindicara.[1] Royle says: "But in the article De Allio another Indian author is quoted, whom I have not been able yet to trace out—*Ait Sindifar* (in another place written "*Dixit sindichar*") *indianus* valet contra Ventositatem." This Sindicara is identified with Vāgbhaṭa II of Sindh who was in his time known as a second Caraka or Cara, the syllable "ka" making no difference, as in words like "bāla" and "bālaka," both meaning a child.[2] We know that the Vāgbhaṭa's Aṣṭāṅga Hṛdaya Saṁhitā was one of the medical works translated by the order of Caliphs in the eighth century.[3]

6. The translations of the Caraka, the Suśruta and the Vāgbhaṭa occur in the Thibetan Tanjur.[4] "George Huth,[5]

[1] Antiquity of Hindu Medicine, Page 38.
[2] History of Aryan Medical Science, P. 196.
[3] Zeit. deut. morg. Ges. 34, p. 465.
[4] Jour. Asiatic Soc. XXXVIII. (1835).
[5] Zeit. deut. morg. Ges. T. (LXIX. pp. 279—284).

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who has recently critically examined the contents of the Tanjur, concludes that the most recent date at which it can be placed is the 8th century A.D."[1]

So I cannot avoid the conclusion that of the three authors, Suśruta, Vāgbhaṭa I and II, to which I'Tsing's remarks may refer, the last has probably the best claims to that reference ; and the date assigned to Vāgbhaṭa I may well suit Vāgbhaṭa II *i.e.*, "as late as the early 7th century A.D.,"[2] and possibly still earlier.[3] Again it is impossible for us to say whether I'Tsing's remarks may not appropriately refer to other authors whose works are lost to us.

Mention should also be made of the fact pointed out by Dr. Cordier that Vāgbhaṭa is mentioned in Rājtaraṅgiṇī and his date is fixed there as 1196-1218 A.D.[4]

But the name of Vāgbhaṭa does not occur in Stein's edition of Rāj, which is no doubt the most reliable, and so we can easily dismiss this view as untenable.

Editions.—Vāgbhaṭa I's book Aṣṭāṅga Saṁgraha has been printed in Bombay.

Commentary.—Aruṇadatta—about 1220 A.D.

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[1] P. C. Rāy's History of Hindu Chemistry, Intro., P. XXIX.

[2] Hoernle's Osteology, Intro., p. 10.

[3] Dr. Kunte places him "at least as early as the second century before Christ," Vide his Intro. to Vāgbhaṭa's Aṣṭāṅga Hṛdaya Saṁhitā.

[4] सिंहगुप्तसुतः परमवौद्धो वागभटाचार्यः काश्मीरनगरपति जयसिंहस्य प्रजापालन समये (खृः द्वादश शताब्द्याम्, शक ११११—४०) वर्त्तमाना आसीत्।

Quoted in Cordier's Vāgbhaṭa et L'Aṣṭāṅgahṛdaya Saṁhitā, 1896.

See Intro. to the Vaidyakśabdasindhu by *Kavirāja* Umeścandra Gupta, 1894.

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VĀGBHAṬA II.

The next great authority in Hindu medicine is Vāgbhaṭa II, son of Siṁha Gupta, an inhabitant of Sindh.[1] His work, Aṣṭāṅga Hṛdaya Saṁhitā, the author himself states, is based on the summary of Vāgbhaṭa the elder.[2] In the first chapter of Sūtra Sthāna, he acknowledges the help he received from the works of Agniveśa, Hārīta, Bhela, and others.[3] The fact that Caraka is not referred to here as one of the sources of Vāgbhaṭa II has been taken advantage of by some to prove the posteriority of Caraka.[4] They conclude that Agniveśa and Suśruta wrote their works long before him, and the Agniveśa Tantra was not called by the name of, and in fact was not as yet edited by, Caraka, at the

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1 भिषग्वरो वाभट इत्यभूनमे
पितामहो नामधरोऽस्मि यस्य
सुतोऽभवत्तस्य च सिंहगुप्तः
तस्याप्यहम् सिन्धुषु जातजन्मा ॥

Aṣṭāṅga.

2 Aṣṭāṅga Hṛdaya Saṁhitā, Uttara Sthāna, Ch. XL, v. 82.
See foot note 2, p. 18.

3 ब्रह्मा स्मृत्वाऽऽयुषो वेदं प्रजापतिमजिग्रहत् ।
सोऽश्विनौ तौ सहस्राक्षं सोऽत्रिपुत्रादिकान्मुनीन् ॥४॥
तेऽग्निवेश्यादिकांस्ते तु पृथक् तन्त्राणि तेनिरे ।
तेभ्योऽतिविप्रकीर्णेभ्यः प्रायः सारतरोच्चयः ।
क्रियतेऽष्टाङ्गहृदयं नातिसंक्षेपविस्तरम् ॥५॥

Aṣṭāṅga Hṛdaya, Sūtra Sthāna, Ch. I.

4 "It would appear also that at the time Vāgbhaṭa lived, Agnivesha's work was not called by the name of Caraka, and Suśruta had also been written. Hence it follows that Caraka's edition of Agnivesa, that is the work now called Caraka, was probably edited after Suśruta had been written."

Dutt's Materia Medica of the Hindus, Intro., p. IX.

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time Vāgbhaṭa II flourished. The argument is however not conclusive; it only shows that the Agniveśa Tantra was available to Vāgbhaṭa II in its original form. No definite results can be expected from this *argumentum ex silentio*. Again it may easily be imagined, and I think it is the right view of the question, that Caraka lived and edited Agniveśa's work long before Vāgbhaṭa, the reason of Caraka being not mentioned in Vāgbhaṭa's book, is the fact that Caraka did not usurp the authorship of Agniveśa Tantra but clearly states at the end of each chapter the real nature of his share in the authorship of his book in the following words:—"Here ends the chapter of Agniveśa Tantra as corrected and edited by Caraka." Many modern text books of medicine have been edited and improved, though the books are still called after the original authors. Moreover to make Caraka flourish after Vāgbhaṭa II would bring him to quite modern times.

We are however arguing on false premises. Though Caraka is not mentioned in the Sūtra Sthāna of Aṣṭāṅga Hṛdaya, his name occurs in the Uttara Sthāna.[1] So there can be no doubt that Caraka's edition of Agniveśa was current in India long before Vāgbhaṭa II wrote his Aṣṭāṅga Hṛdaya Saṁhitā.

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[1] यदि चरकमधीते तदध्रुवं सुश्रुतादि
प्रथिगदितगदानां नाममात्रेऽपि वाच्यः।
अथ चरकविहीनः प्रक्रियायामखिन्नः
किमिह खलु करोतु व्यधितानां वराकः ॥४९॥
* * * *
ऋषिप्रणीते प्रीतिश्चेन्मुक्त्वा चरकसुश्रुतौ।
भेड़ाद्याः किं न पठ्यन्ते तस्माद्वाच्यं सुभाषितम् ॥५३॥

Aṣṭāṅga Hṛdaya Saṁhitā, (Ed. Vijayratna Sen), Uttara Sthāna, Ch. XL.

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Editions.—There are various editions of the book but the following are reliable :—

1. By Dr. Anna Moreśvara Kunte, M.D., 2 vols., Bombay, 1880; 2nd Ed., 1891.
2. By Jībānanda Vidyāsāgara, Calcutta, 1882.
3. By Vijayratna Sen Kaviranjana, Calcutta, 1885-90.
4. By Ganeś Sastri Tartevaidya, Bombay, 1888.
5. In Sanskrit and Bengali, with the commentary of Arūṇadatta by Vijayratna Sen Gupta, Calcutta, 1888.
6. In Sanskrit and Guzrathi by Behicharlal Nathuram, Ahmedabad, 1889.
7. In Sanskrit and Bengali by Kāliśa Cundra Sen Gupta, Calcutta, 1890-1892.
8. In Sanskrit and Hindi by Pandit Robi Dutta, Bombay, 1890.
9. In Sanskrit and Marathi by Ganeś Kṛṣṇa Garde, Poona, 1891.
10. In Sanskrit and Bengali by *Kavirāja* Binod Lāl Sen, Calcutta, 1891-1892.

Commentaries.[1]—

1. Sarvāṅga Sundarī[2] by Arūṇadatta, son of Mṛgāṅkadatta, 1220 A.D.

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[1] See Cordier's Vāgbhaṭa et L'Aṣṭāṅgahṛdaya Saṁhitā, P. 6.

[2] इति श्रीमृगाङ्कदत्तपुत्र श्रीमदरुणदत्तविरचितायां सर्व्वाङ्गसुन्दराख्यटीकायां * * * * .

Colophon at the end of each Chapter of the Commentary.

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2. Āyurvedadarśayana (Dinacharyā Prakarana) by Hemadri or Kamadeva, Raja of Devagiri. It is available in parts only.
3. Aṣṭāṅgahṛdayarddyota by Aśadhara Sallaxana.
4. Padārthacandrikā by Candracandana.
5. Saṅketamañjarī by Dāmodara.
6. Aṣṭānga Hṛdayatīkā by Rāmanāth Vaidya.
7. Vālaprobodhikā (Anonymous).
8. Hṛdayabodhikā „
9. Pāṭhya.
10. Vāgbhaṭartha Kaumudī by Hari Kṛṣṇa Sen Mullick.
11. Pradīpa by Jaśodānandan Sarkār, 1298 B.S.

VĀGBHAṬA III.

The author of Rasaratna Samuccaya in the Colophons at the end of each chapter identifies himself with Vāgbhaṭa II: "Here ends Book first (or so) of R.R.S. composed by Vāgbhaṭa, son of Siṁha Gupta, prince of physician." The salutation at the beginning of his book is strictly Buddhistic. The probable date of the book is "placed between the thirteenth and fourteenth centuries A.D."[1] "The chemical knowledge, as revealed in Vāgbhaṭa is almost on a par with that in the Suśruta," whereas the R. R. S. indicates an advanced state of that science. He quotes Rasārṇava as a source of his information; he does not mention opium as a medicine, and the Firaṅga roga and its treatment find no place in his book.

[1] P. C. Rāy's History of Hindu Chemistry, Intro., p. li.

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MĀDHAVAKARA.

He is the author of the famous work on Pathology or Nidāna. His book was translated into Arabic by the order of Harun-Al-Rasid and so the most recent date that can be assigned to him is the seventh century A.D.[1] Thakore Saheb of Gondal identifies him with Mādhabācāryya, the celebrated author of Sarvadarśana Saṁgraha, the brother of Sāyana, the commentator of the Vedas.[2] I do not find any authority for such an assertion and here is an example of fallacious reasoning based simply on the identity of names. Mādhabācāryya and Sāyana lived in the twelfth century A.D. Mention should also be made of the view expressed by Dr. Hoernle as certain that Mādhavakara, the author of Nidāna and Vṛnda Mādhaba, the author of Siddhayoga are one and the same person. He holds that Vṛnda is the real name, but he was known to the commentators as Mādhava, for his melodious diction. There is no proof given of this opinion, and we have reasons for not accepting it. However as he does not treat of surgical instruments, his work is not important to us.

CAKRAPĀṆIDATTA.

Cakrapāṇidatta or more commonly Cakradatta in a Colophon[3] has given an account of himself in his book called

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[1] Jolly's Indian Medicine, ff. 5, 6, pp. 7-9.

[2] History of Aryan Medical Science, Ch. II, p. 35.

[3] गौड़ाधिनाथ रसवत्याधिकारिपाच—
नारायणस्य तनयः सुनयोऽन्तरङ्गात्।
भानीरनु प्रथितलौध्रवलीकुलीनः
श्रीचक्रपाणिरिह कर्त्तृपदाधिकारी॥

Colophon in Cakradatta.

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Cikitsā Sāra Saṁgraha: "The author of this work is Śrī Cakrapāṇi who belongs to the family of Lodhravalī; and who is the youngest brother of Vānu and the son of Nārāyaṇa, the superintendent of the kitchen of Nayapāla,[1] the king of Gour." This book is arranged on the plan of Vṛnda in his Siddhayoga[2] which again follows closely as a companion volume to Mādhava's Nidāna.[3] The age of Cakradatta is about 1060 A.D.; and Vṛnda must have flourished between Mādhava and Cakrapāṇi for he quotes the former while he is himself quoted by the latter. So the probable age of Vṛnda is the ninth century A.D. Besides being a celebrated author, Cakradatta wrote excellent commentaries of Caraka and Suśruta. His extant works are—

1. Cikitsā Sāra Saṁgraha or Cakradatta. A treatise on Medicine.

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[1] For the date of Nayapāla, vide Cunningham's Archœo. Survey of India. III. P. 119; also J. A. S. LX. Pt. I. P. 46. Life of Atisa by S. C. Dās.

[2] यः सिद्धयोगलिखिताधिकसिद्धयोगा—
नवैव निक्षिपति कैवलमुद्धरेद्या।
भङ्गत्रयत्रिपथवेदविदा जनेन
दत्तः पतेत् सपदि मूर्द्धनि तस्य शापः॥

Śloka at the end of the Cakradatta.

य इत्यादौ।—सिद्धियोग इति इन्दत्तसंग्रहस्य संज्ञा, तल्लिखितयोगमपेक्ष्याधिका ये च सिद्धियोगा अत्र संग्रहे उक्तास्तानधिकयोगान् तत्रैव सिद्धियोगे निक्षिपति, तथा यो वा तानधिकसिद्धयोगानितः संग्रहादुद्धरेत् दूरीकुर्यात्, तस्य मूर्द्धनि दुष्टेन पुंसा दत्तः शापः पतेत्। कीदृशेन पुंसा? भङ्गत्रयत्रिपथवेदविदा। कारिका इहटीका चन्द्रटीकेति भङ्गत्रयं, त्रिपथवेदः ऋग्यजुःसामरूपः, तद्विदा॥

Śibadāsa Sen's Commentary.

[3] इन्देन * * * * * * संलिख्यते गदविनिश्चयक्रमेन॥

Vṛnda's Siddhayoga.

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2. Cakradatta or Materia Medica. It treats on drugs applicable to a number of deseases.

3. Muktābali. This treatise on the nature and properties of medicinal drugs is ascribed to Cakrapāṇi.

4. Vānumati—Commentary on Suśruta Saṁhitā.

5. Cakratattwadīpikā—Commentary on Caraka Saṁhitā.

Editions.—

1. Cakradatta or Cikitsā Sāra Saṁgraha edited by *Kavirāja* Pyāri Mohan Sen Gupta, Calcutta, 1295 B.S.

2. Cakradatta with Bengali translation by Candrakumār Dās Kavibhuṣan.

3. Cakradatta with Bengali translation and with commentary of Śiva Dās Sen, by Jaśodā Nandan Sarkār, 1302 B.S.

SĀRAṄGADHARA.

He wrote Sāraṅgadhara Saṁgraha. It is compiled from the works of Caraka, Suśruta, Vāgbhaṭa and others.[1] It is very popular in Western India. It treats on nosology and practice of Medicine. He was the son of Dāmodara and flourished in the fifteenth century A.D.

Edition.—By *Kavirāja* Pyāri Mohan Sen Gupta, Calcutta, 1296 B.S.

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[1] प्रसिद्धयोगा मुनिभिः प्रयुक्ता
चिकित्सकैर्यैर्बहुशोऽनुभूताः ।
विधीयते शार्ङ्गधरेण तेषां
सुसंग्रहः सज्जनरञ्जनाय ॥

Sāraṅgadhara Saṁgraha, I. i.

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Commentary.—Sāraṅgadharatīkā: It is a commentary on the above work by Adhamulla.

BHĀVA MIŚRA.

About 350 years ago, a compilation was made by Bhāva Miśra, son of Lataka Miśra, an inhabitant of Benares, from the most celebrated medical works and was called Bhāva Prakāśa.[1] He lived about 1550 A.D. and was considered a "Jewel of Physicians and Master of Śāstras." He mentions China root called Tob Chini[2] in the Vernacular as a remedy of Firaṅga roga or Syphilis[3] which he describes for the first time in India. He was the first to make mention of certain drugs of foreign countries as Badhkshani Naspasi,

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[1] आयुर्व्वेदाब्धिमध्यादतिमतिमुनयो योगरत्नानि यत्ना-
ल्लब्ध्वा स्वे स्वे निबन्धेदधुरखिलजन व्यधिविध्वंसनाय।
तत्तद् ग्रन्थादृगृहीतैः सुवचनमणिभि र्भावमिश्रश्चिकित्सा
शास्त्रे जाड्यान्धकारं प्रशमयितुमिमं सन्विधत्ते प्रकाशम् ॥

Bhāva Prakāśa, I. i.

इति श्रीमिश्र लटकतनय श्रीमन्मिश्रभावविरचिते
भावप्रकाशे षष्ठ प्रकरणं सम्पूर्णं ॥

Colophon at the end of Section I.

[2] द्वीपान्तरवचा किञ्चित्तिक्तोष्णा वह्निदीपिनी।
विबन्धाध्मानशूलघ्नी श्लेष्मन्मूत्रविशोधिनी ॥
वातव्याधीनपस्मारमुन्मादं तनुवेदनाम्।
व्यपोहति विशेषेण फिरङ्गामयनाशिनी ॥

Bhāva Prakāśa, I. i.

[3] फिरङ्गसंज्ञके देशे बाहुल्येनव यद्भवेत्।
तस्मात् फिरङ्ग इत्युक्तो व्याधिर्व्याधिविशारदैः ॥

Bhāva Prakāśa, II. iv.

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Khorasani and Parasika Vacha (Acorus Calamus), Sulemani Kharjura (date fruit of Suleman),[1] and opium.

Editions.—

1. By Jībānanda Vidyāsāgara, Calcutta, 1875.
2. By Rasik Lāl Gupta.
3. By Kālīśa Candra Vidyāratna.

Besides these books, the number of Sanskrit medical works is simply legion; many of them are daubed with fancy names and are excellent treatises on the different branches of medical science. But they are quite foreign to our purpose. I intend to publish in a separate volume short notices of the medical authors and their works, and so we need not dwell on them here.

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[1] पारसीक यवानी तु यवानी सदृशी गुणैः।
विशेषात् पाचनी रूक्षा याहिणी मादिनी गुरुः॥

Bhāva Prakāśa, I.

पारसीकवचा शुक्ला प्रोक्ता हैमवतीति सा।
हैमवत्युदिता तद्वातं हन्ति विशेषतः॥

Ibid.

उक्तं खसफलचीरमाफूकमहिफेणकम्।

Ibid.

चीनाक सन्नः कर्पूरः कफत्वयकरः स्मृतः।

Ibid.

खर्ज्जुरी गोस्तनाकारा परदीपादिहागता॥

Ibid.

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CHAPTER II.

HOSPITALS AND DISPENSARIES.

Before entering into our proper subject, it would not be amiss to notice here two objects—Hospitals and Anæsthetics—which are essentially necessary for the devolopment of surgical knowledge. We know from the Edict II of Aśoka that India during his reign was studded with hospitals not only for the treatment of human beings but also for the brute creations. But even before Aśoka, hospitals flourished in India. In Caraka we can trace the germ of such an institution though it was used for rich men and did not accommodate the public.[1]

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[1] दृढ़ं निवातं प्रवातैकदेशं सुखप्रविचारमनुपत्यकं धूमातपरजसामनभिगमनीयमनिष्टानाञ्च शब्द-स्पर्श-रस-रूप-गन्धानां सोपानोदूमलमुषलवर्च्चःस्थानस्नानभूमिमहानसोपेतं वास्तुविद्या-कुशलः प्रशस्तं गृहमेव तावत् पूर्व्वमुपकल्पयेत्।

ततः शीलशौचानुरागदाक्ष्यप्रादक्षिण्योपपन्नानुपचारकुशलान् सर्व्वकर्म्मसु पर्यवदातान् सूपौदनपाचकस्नापकसंवाहकोत्थापकसंवेशकौषधपेषकांश्च परिचारकान् सर्व्वकर्म्मस्वप्रति-कुलान्। तथा गीतवादित्रोल्लापकश्लोकगाथाख्यायिकेतिहास-पुराणकुशलानाभिप्राय-ज्ञाननु-मतांश्च देशकालविदः परिषद्यांश्च। तथा लावकपिञ्जलशशहरिणैनकालपुच्छकमृगमातृकी-रभ्रान्। गाञ्च दोग्ध्रीं शीलवतीमनातुरां जीवद्वत्सां सुप्रतिविहिततृणशरणपानीयाम्। जल-पात्राचमनोदकोष्ठमणिकपिठरघटकुम्भीकुम्भकुण्डशरावदर्व्वीकपरीपचनमन्थानचेलसूत्रकार्पासी-र्णादीनि च शयनासनादीनि चौपन्यस्तभृङ्गारप्रतिग्रहाणि सुप्रयुक्तास्तरणोत्तरप्रच्छदो-पधानानि स्वापाश्रयानि संवेशनोपवेशनस्नेहस्वेदाभ्यङ्गप्रदेहे परिषेकानुलेपनवमनविरेचना-स्थापनानुवासन-शिरोविरेचनमूत्रोच्चारकर्म्मणामुपचारसुखानिसुप्रक्षालितोपधानाश्च श्लक्ष्णखर-मध्यमा दृशद शस्त्राणि चोपकरणार्थानि।

धूमनेत्रं वस्तिनेत्रञ्चोत्तरवस्तिकञ्च। कुशहस्तञ्च तुलाञ्च मानभाण्डञ्च घृततैलवसामज्जक्षौद्र-फाणितलवणेन्धनोदक-मधुसुरासौवीरकतुषोदकमैरेयमेदकदधिमण्डोदश्विद्धान्याम्लमूत्राणि च। तथा शालिषष्टिकमुद्गमाषयवतिलकुलत्थबदरमृद्वीकापरूषकाभयामलकबिभीतकानि नाना-विधानि च स्नेहस्वेदापकरणानि द्रव्याणि तथैवोर्द्ध्वहरणानुलोमिकोभयभाञ्जि संग्रहनीयदीप-नीयपाचनीयोपशमनीयवातहराणि समाख्यातानि चौषधानि यच्चान्यदपि किञ्चिद्व्यापदः परिसंख्यायोपकरणं विद्यते यच्च प्रतिभोगार्थं तत्तदुपकल्पयेत्॥

Caraka Saṁhitā. I., xv.

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He advises us as follows:—The engineer is to erect a strong and spacious building, well-ventilated at one part, the other part being free from draughts. The scenery should be pleasing and one should feel happy to walk in it. It must not be behind any high building, nor exposed to the glare of the sun. It should be inaccessible to smoke and dust. There must not be anything injurious to our senses as regards sound, touch, taste, form and smell. There should be stairs, large wooden mortars and pestles; and there must be additional bare ground for the construction of a privy, bath-room and kitchen. The staff should consist of servants and companions. The servants should be good, virtuous, pure, fond, clever, generous, well trained in nursing, skillful in works, able to cook rice and curries well, competent to administer a bath, expert masseur[1], trained in raising and moving a patient, dexterous in making or cleaning beds, practiced in the art of compounding medicines and willing workers not likely to show displeasure to any order. The companions should be good singers and musicians, fluent speakers, well-versed in distichs, ballads, tales, history and mythology, well-acquainted with the design of a patient's nods or signals, agreeable and should have knowledge of the season and the locality. The various kinds of animals

[1] From the accounts of Megasthenes, we learn that four attendants used to massage him (Candragupta) with ebony rollers during the time that he was engaged in disposing of cases. Such an attendant (saṁvāhaka) is a minor character in the Toy Cart or little Clay Cart, drama, transl. by Ryder, in Havard Oriental Series, Vol. IX, 1905—Smith's Early History of India, 2nd Ed., Page 122. Footnote. We also find in the Kāmandikya Nītisāra that the king is cautioned against shampooers who have the opportunity of poisioning him.

सूदव्यञ्जनकर्त्तारस्तल्पका व्यवकास्तथा।
प्रसाधका भोजकाश्च गात्रसंवाहका अपि॥

Ch. XII. V. 45.

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should always be kept in stock such as Lāva (*Perdix Chinensis*), Kapiñjala (partridge), hares, sheep and the different kinds of deers, Ena (the black antilope) blacktailed deer, and Mṛgamātṛka. There should be a diary attached to the building. The cow should be good natured and healthy, and should yield profuse milk. The calves must be living. There should be stocked for them potable water and hay in a clean fold. In that building must be kept the following necessary articles :—

Water vessels, washing basins, tubs, jars, dishes, ghata, (small jars) kumbhī, kumbha (larger and smaller vessels), kundu (jug or pitcher), soraba (earthen basins), spoons or ladles, cooking utensils, churning rods, cloth, thread, cotton, wool, bedding and āsana (seats). Near them should be placed drinking vessels of gold and spittoons. The bedding should consist of a broad carpet, bed-sheet, pillows, and a bedstead. There should be collected good furnitures for beds and seats ; and also utensils and appliances for application of oleaginous medicines, heat, oil, ointment, bath and perfumeries, and for the acts of emesis, purgation, draining of the brain, injection into the rectum, defaecation and urination (*i.e.* Vastiyantra, urinal, bed-pan &c.). The blunt and sharp instruments and their accessories, well-washed mullers and whetstones of different degrees of smoothness—polished, plain or rough—should be near at hand ; the tubular instruments for fumigation, inhalation and injection into the rectum, urethra and vagina, should be available there ; and the following articles are also to be stocked :—brushes and brooms, weighing scales and weights, ghee (melted butter), oil, fat, marrow, honey, molasses, salt, wood, water, spirituous liquor formed by steeping husked grains of barley in water, or by boiling together the husks of fried māṣkalāya

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(pulse of Phaseolous Rox.), barley and water, spirituous liquor from the blossoms of Lythrum Fruticoscence with sugar, spirit distilled from the different sorts of grains, curdled milk, rice, gruel, whey, sour liquid produced from the aceteus fermentation of powdered paddy, and the various kinds of urines of animals. Different kinds of rice such as Śāli (or that reaped in cold season) and Saṣṭhika (or that grown in hot weather in low lands and reaped within sixty days of its sowing), Mudga (Phaseolus mungo), Māṣa (Phaseolus Rox.), Yava (Hordeum Vulgare), seasame (Seasamum Indicum), Kullatha (Dolichos Biflorus), plums (Zizyphus Jujube), raisins (Vitis Vinifera), Paruṣa (Grewia Asiatica), Abhayā (Chebulic Myrobolan), Āmlakī (Phyllanthus Emblica), Vibhītaka (Terminalia Bellerica) and other classes of medicaments, as oils, diaphoretics, sternutatories, cathartics, emetics, purgatives, astringents, stomachics, digestives, calmatives, carminatives and various other forms of medicines, are required for treatment. Besides these, there must be stored the antidotes to poisons caused by overdoses of medicines and other appliances likely to add to the patient's comfort.

To this may be compared the description of the Greek iatrium, which is mentioned in the Hippocratic treatise, De Medicio. He directs that "it should be so constructed that neither the wind nor sun might prove offensive to the patient, and goes on to enumerate the various articles which it should contain, such as scalpels, lancets, cupping-instruments, trepans, raspatories, with bandages and medicines." [1]

[1] Works of Hippocrates, Syd. Soc. Vol. II, page 470, Footnote.

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Suśruta gives us a list of appliances[1] required in surgical operations:—

1. Blunt Instruments. 2. Sharp Instruments. 3. Potential Cautery. 4. Actual Cautery. 5. Śalākā or rods. 6. Horns. 7. Leeches. 8. Hollow bottle gourd. 9. Jāmbav-oustha [a bougie of blackstone, the extremity of which is shaped like the fruit of the Jambul tree (Urginea Jāmbolana)]. 10. Cotton. 11. Pieces of cloth. 12. Thread. 13. Leaves. 14. Materials of bandaging. 15. Honey. 16. Ghee, or clarified butter. 17. Suet. 18. Milk. 19. Oils. 20. Tarpan.—flour of any perched grain or condensed milk etc. mixed with water to mitigate thirst. 21. Decoctions. 22. Liniments. 23. Plasters. 24. Fan. 25. Cold and hot water. 26. Iron pans, kalasi and other earthen vessels; beddings and seats. 27. Obedient, steady and strong servants.

The Lying-in-room.—Caraka says: "Before the ninth month of pregnancy, the lying-in-room should be constructed. The land should be cleaned of bones, gravels and potsherds. The ground selected should be of auspicious colour, taste and smell. The gate of the house should face towards the east or the north.[2] There must be a store of wood such as Vilva (Ægle

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[1] अतोऽनामतं कर्म चिकीर्षता वैद्येन पूर्वमेवोपकल्पयितव्यानि तद्यथा यन्त्रशस्त्रक्षाराग्नि-शलाकाश्यङ्गजलौकालाबूजाम्बवौष्ठपिचुप्रीतसूत्रपट्टमधूघृतवसापयस्तैलतर्पणकषायलेपन कल्क-व्यञ्जनशीतोष्णोदक कटाहदीनि पारकर्मणश्च स्निग्धाः स्थिरा बलवन्तः।

Suśruta Saṁhitā. I. v.

[2] "The best sort of ground should abound with milky trees, full of fruits and flowers; its boundary should be of a quadrangular form, level and smooth, with a sloping declivity towards the east producing a hard sound, with a stream running from left to right, of an agreeable doour, fertile, of an uniform

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Marmelos), Tinduka (Diospyros Embryopteris), Inguda (Balanites Rox.) Bhallākaka (Semecarpus Anacardium), Vāruṇa (Ocimum Basilicum), Khadira (Acacia Catechu) or wood of other kinds said to be auspicious by a Brāhman versed in the Atharvaveda; and there must be a sufficient provision for clothes, liniments, and covers. For the pregnant woman, be careful to have a fire-place, water, pestles and mortars, a privy, a bathing place, and ovens. These should be constructed according to the science of engineering and should be pleasant with regard to the season. There should be collected clarified butter, oil, honey, different kinds of salts as rock salt, sonchal salt, and black salt, Viḍañgas (Embelic Ribes), treacle, Kuṣṭha (Saussurea Lappa), Kilima (Pinus Deodara), Nāgara (dried root of Zinziber Officinale), Pippalī (Piper Longum), its root, Hasti-pippalī (Scindaspus Officinalis), Mandukparni (Hydroctyle Asiatica), Elā (Elettarium Cardamomum), Lāngolī (Gloriosa Superba), Vāca (Acorus Calamus), Cavya (Piper Cava), Chitraka (Plumbago Zeylanicum), Chiravilva (Pongamia Glabra), Hingu (Ferrula Assafætida), Sarṣapa (Mustard seeds), Laśuna (Allium Sativum), finely or thickly powdered rice, Kadamba (Anthocephalous Kadamba), Ātasi (Linum Usitatissimum), Vallija (Cucurbita Pepo), Bhurya (Betula Bhojpatra), Kulatha Dolichos Uniflorus), Maireya (a spirituous liquor from the blossoms of Lythrum Frutecoscence) and Āshava (Vinous fermented liquor from sugar or molasses, Rum). Also clollect two pieces of

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colour containing a great quantity of soil, producing water when dug to the height of a man's arm raised above his head, and situated in a climate of moderate temperature."

Manosara, Ch. I. quoted in Ram Raz's The Architecture of the Hindus, Page 16.

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stone (muller and stone slabs), two pestles, two mortars, an ass, a bullock, two sharp needles of gold and silver, two skeins of threads, sharp instruments of steel, two wooden bedsteads (Ægle Marmelos), and wood (Tinduka and Ingudi) for easily igniting fire. The female attendants should be mothers of children, and friends and relatives of the patients. They must be fond of her, skillful in work, intelligent, jolly, laborious full of tender love for the children and a favourite of the mother."[1]

The Child's Room:—He continues—" The engineer is to construct a room, spacious, beautiful, full of light, well-ventilated but free from draughts, strong, and free from beasts of prey, animals with fangs, mice and insects. There should be kept water, mortar and seperate places should be assigned for bathing, cooking, urination and dcfæcation. It should suit the season of the year. The beddings, seats and covers should be confortable and suitable to the season. Auspicious ceremonies should be performed in that room such as *homa*, expiations and presents to gods, for the proper protection of the child ; and there should be present pious old men, doctors, and devoted

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[1] प्राक् चैवास्या नवमान्मासात् सुतिकागारं कारयेदपहृतास्थिशर्कराकपालेदेशं प्रशस्तरूपरसगन्धायां भूमौ प्राग्द्वारमुदग्द्वारं वा। तत्र वैल्वानां काष्ठानां तिन्दुकैङ्गुदानां भल्लातकानां वारुणानां खदिरानां वा यानि चानान्यपि ब्राह्मणाः शंसेयुरथर्व्ववेदविदस्तद्वसनालेपनाच्छादनापिधानसम्पदुपेतं तत्। वास्तु-विद्या-हृदययोगेनाग्निसलिलोलुखलवर्च्चःस्थानस्नानभूमिमहानसमृतुसुखञ्च। तत्र सर्पिस्तैलमधुसैन्धवसौवर्च्चलकाललवणविड़ङ्गगुड़कुष्ठकिलिमनागरपिप्पलीमूलहस्तिपिप्पलीमण्डूकपर्ण्यैलालाङ्गलीवचाचव्यचित्रकचिरविल्व-हिङ्गुसर्षप लशुनकनकनिकानीपातसीवल्विजभूर्ज्जाः कुलत्थमैरेयसुरासवाः सन्निहिताः स्युः॥ तथाश्मानौ द्वौ द्वे चण्डमूषले द्वे उलूखले खरौ वृषभश्च द्वौ च तीक्ष्णौ सूचीपिप्पलकौ सौवर्णराजतौ द्वे शस्त्राणि च तीक्ष्णायसानि द्वौ च विल्वमयौ पर्य्यङ्कौ तैन्दकैङ्गुदानि काष्ठन्यग्निसन्धुक्षणानि स्त्रियश्च वह्व्यो वहुशःप्रजाताः सौहार्द्दयुक्ताः सततमनुरक्ताः प्रदक्षिनाचाराः प्रतिपत्तिकुशलाः प्रकृतिवत्सलास्त्यक्तविषादाः क्लेशसहिष्णवोऽभिमता ब्राह्मणश्चाथर्व्ववेदविदो यच्चान्यदपि तत्र समर्थं मन्येत यच्च ब्राह्मनाः ब्रूयुः स्त्रियश्च वृद्धास्तत्कार्य्यम्॥

Caraka Saṁhitā. IV. viii.

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attendants constantly. The child's bed, covers and sheets should be soft, light, pure and scented. These should always be free from sweat, dirt, worms or bugs, urine and fæces. If repeated change of new clothes be impossible, the soiled coverings should be well washed and the beddings well purified with steam and thoroughly dried before they are used again. To purify or sterilise the dress, beddings, coverings and sheets by fumigation use the following medicines with clarified butter:—Barley (Hordeum Vulgare), mustard seeds, linseeds, assafœtida, Guggula (Balsamodendron Mukul), Vāca (Acorus Calamus), Coraka (Andropogon Acicularis), Vayasthā (Chebulic Myrobolan), Golomi (Panicum Dactylon), Jaṭilā (Nardostachys Jatamansi), Palankaṣā (a variety of Guggula), Aśoka (Saraca Indica), Rohiṇī (Picrorrhiza Kurroa) and sankes' skin.....A variety of toys to please the child should be at hand and these should be coloured, light, musical, beautiful and must not be sharp pointed. They should be of such a size and shape as cannot be put into the childs' mouth or do not terrify or kill the child."[1]

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[1] अतोऽनन्तरं कुमारागारविधिमनुव्याख्यास्यामः॥ वास्तुविद्याकुशलः प्रशस्तं रम्यमतमस्कं निवातं प्रवातैकदेशं दृढ़मपगतश्वापदपशुदंष्ट्रिमूषिकपतङ्गं सुसंविभक्तसलिलोदूखलमूत्रवर्च्चः-स्थानस्नानभूमिमहानसमृतुसुखं यथर्त्तु शयनासनास्तरणसम्पन्नं कुर्य्यात्। तथा सुविहित-रक्षाविधानवलिमङ्गलहोमप्रायश्चित्तं शुचिवृद्धवैद्यानुरक्तजनसम्पूर्णमिति। कुमारागारविधिः॥ शयनास्तरणप्रावरणानि कुमारस्य मृदुलघुशुचिसुगन्धीनि स्युः। स्वेदमलजन्तुमन्ति मूत्रपूरी-षोपसृष्टानि च वर्ज्ज्यानि स्युः॥ असति सम्भवेऽन्येषां तान्येव च सुप्रक्षालितपोधानानि सुधूपितानि सुशुद्धशुष्काण्युपयोगं गच्छेयुः। धूपनानि पुनर्वाससां शयनास्तरणप्रावरणानाञ्च यवसर्षपातसीहिङ्गुगुग्गुलवचाचोरकवयःस्थागोलोमीजटिलापलङ्कषाशोकरोहिणीसर्पनिर्म्मोकानि घृतसम्प्रयुक्तानि स्युः॥ मणयश्च धारणीयाः कुमारस्य खड्गरुरुगवयवृषभानां जीवतामेव दक्षिणेभ्यो विषाणेभ्योऽग्राणि गृहीतानि स्युः। मन्त्राद्याश्चौषधयो जीवकर्षभकौ च यान्यप्यन्यानि ब्राह्मणाः प्रशंसेयुः। क्रीड़नकानि खल्वस्य तु विचित्राणि घोषवन्त्यभिरा-माणि अगुरुण्यतीक्ष्णाग्रानि अनास्यप्रवेशीनि अप्राणहराणि अवित्रासनानि स्युः॥

Caraka Saṁhitā IV. viii.

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Suśruta directs that there should be a particular room provided for patients who have undergone surgical operations.[1] "Patients suffering from surgical diseases as inflammatory swelling, wounds &c. should, from the very commencement of their illness, confine themselves inside a clean house, situated in a wholesome locality, free from draughts and not exposed to the glare of the sun. For, in such a building, constitutional, mental and accidental diseases are not likely to occur. In that room, the bed for the patients should be soft, spacious, and well-arranged. The patient should lie down, his

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[1] व्रणिनः प्रथममेवागारमन्विच्छेत्तच्चागारं प्रशस्तवास्त्वादिकं कार्य्यं ।

प्रशस्तवास्तुनिगृहे शुचावातपवर्ज्जिते ।
निवाते न च रोगाः स्युः शारीरागन्तुमानसाः ॥

तस्मिन् शयनमसम्बाधं स्वास्तीर्णं मनोज्ञं प्राक्शिरस्कं सशस्त्रं कुर्व्वीत ।

सुखचेष्टाप्रचारः स्यात् स्वास्तीर्णे शयने व्रणी ।
प्राच्यां दिशि स्थिता देवास्तत्पूजार्थं नतं शिरः ॥

तस्मिन् सुहृद्भिरनुकूलैः प्रियम्वदैरुपास्यमानो यथेष्टमासीत् ।

सुहृदो विक्षिपन्त्याशु कथाभिर्व्रणवेदनाः ।
आश्वासयन्तो वहुशस्त्वनुकूलाः प्रियम्वदाः ॥

न च दिवानिद्रावशगः स्यात् ।

दिवास्वप्नाद्व्रणे कण्डूर्गात्राणां गौरवं तथा ।
श्वयथुर्व्वेदनारागः स्रावश्चैव भृशं भवेत् ॥

उत्थानसंवेशनपरिवर्त्तनचंक्रमणोच्चैर्भाषणादिषु चात्मचेष्टास्वप्रमत्तो व्रणं संरक्षेत् ।

स्थानासनं चंक्रमणं यानयानातिभाषणं ।
व्रणवान्न निषेवेत शक्तिमानपि मानवः ॥
उत्थानाद्यासनं स्थानं शय्यां चातिनिषेविता ।
प्राप्नुयान्मारुतादङ्गे रुजस्तस्माद्विवर्ज्जयेत् ॥

गम्याणाञ्च स्त्रीणां सन्दर्शन्मसम्भाषणसंस्पर्शनानिदूरतः परिहरेत् ।

Suśruta Saṁhitā I. xix.

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head pointing towards the east, and keep there some weapon for his own protection. On such a bed, the patient can lie comfortably and turn to his sides at pleasure. He should be surrounded by his dear friends, for their sweet words relieve the pain of inflammation. The female friends, however, should be avoided and kept at a distance. He should observe strictly the orders of the surgeon as regards his food, drink and mode of living. He should have his hairs clipped and nails pared short, be pure in his person, put on white clothes and devote himself to religious duties. A light should be kept burning; and garlands of flower, weapons &c., should be provided in the room to ward off the demons. He should be cheered and inspired by pleasant stories; and the physicians and the priests should attend the patient morning and evening. Pastils made of Sinapis Nigra and Azadirachta Indica with clarified butter and salt, should be burnt in the room morning and evening for ten days continually. The inflamed part should be fanned with a *cāmar* or yolk-tail. Sleep during the day, exercise and sexual intercourse must on no account be indulged in."

Suśruta also describes the kitchen of the king thus:— "That is the proper kitchen which is built on good ground, towards an auspicious quarter, full of utensils for cooking, spacious, clean, provided with windows guarded by a network, frequented by friends, cleared well of grass furnished with a canopy, purified by auspicious ceremonies, and managed by men and women of good character. The superintendent of the kitchen should, like the doctor, be noble and virtuous. The cook and servants should be pure, noble, capable, mild, good looking, engaged in their respective duties, high-minded, should have their hairs and nails cut short, steady,

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well-bathed, of subdued passion, well-dressed, obedient and have their heads well-covered."

"The doctor in charge of the kitchen should be of noble family, religious, friendly, a clever manager for getting king's food properly prepared, ever careful for his health, non-avaricious, simple, fond, grateful, good-looking, cool-tempered, well-behaved, not proud and envious, laborious, of subdued passion, forgiving, pure, of good character, kind, intelligent, not easily fatigued, always loving, well wisher, capable, bold, clever, skillful, not unreasonably tender, provided with medicines and well proficient in the art of healing."[1]

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1 कुलीनं धार्मिकं स्निग्धं सुभृतं सततोत्थितं।
अलब्धं अशठं भक्तं कृतज्ञं प्रियदर्शनं॥
क्रोधपारुष्यमात्सर्य्यं मदालस्य विवर्ज्जितं।
जितेन्द्रियं क्षमावन्तं शुचिं शीलदयान्वितं॥
मेधाविनमसंभ्रान्तमनुरक्तं हितैषिणं।
पटुं प्रगल्भं निपुणं दक्षं मायाविवर्ज्जितं॥
पूर्व्वोक्तैश्च गुणैर्युक्तं नित्यं सन्निहितागदं।
महानसे प्रयुञ्जीत वैद्यं तद्विद्यपूजितं॥
प्रशस्तदिग्देशकृतं शुचिभाण्डं महच्छुचि।
सजालकं गवाक्षाढ्य मात्मवर्गं निषेवितं॥
विकृतसृष्टसंसृष्टं सवितानं कृतार्च्चनं।
परीक्षित स्त्रीपुरुषं भवेच्चापि महानसं॥
तत्राध्यक्षं नियुञ्जीत प्रायो वैद्यगुणान्वितं।
शुचयो दक्षिणा दक्षा: विनीता: प्रियदर्शना:॥
सविभक्ता: सुमनसो नीच कैशनखा: स्थिरा:।
स्नाताद्य: संयमिन: कृतीक्षणा: सुसंयुता:॥
तस्याज्ञा विधेयास्तु विविधा: परिकर्म्मिण:।
आहारस्थित यश्चापि भवन्ति प्राणिनो यत:॥
तस्मान्महानसे वैद्य: प्रमाद रहितो भवेत्।
माहानसिक वीदार: सौपौदनिक पौपिका:॥
भवेयुर्वैद्यवशगा ये चाप्यन्ये तु केचन।
इङ्गितज्ञो मनुष्याणां वाक्चेष्टमुखवेक्षते:॥

Susruta Saṁhitā V. I.

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In the Kāmandakiya Nītisāra, we find the king advised to take thoroughly examined food, and to be surrounded by physicians well-versed in the science of Toxicology;[1] and again it is said that king should take his medicines, cordials, and edibles after having his medical attendants tasted them.[2] The king is advised to kill his enemy by weaning over his physician or by administering poisonous liquids.[3]

In the Mahāvāgga[4] we find the qualities of a good patient and a good nurse described:—

"6. What are five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon—

When he does do what is good for him; when he does know the limit (of the quantity of the food) that is good for him; when he does take his medicine, when he does let a nurse who desires his good, know what manner of disease he has, or when he is getting worse that that is so, or when it is getting better that that is so; and when he has become able to bear bodily pains that are severe, sharp, grievous, disagreeable, unpleasant and destructive to life. These are the five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon.

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1 विषन्नैरुदकैः स्नातः विषघ्ननिभूषितः।
परीक्षितं समन्त्रीयाज्जाङ्गुलाविद्विषवृतः॥ १०॥
Kāmandakya Nitisāra vii. v. 10.

2 औषधानि च सर्व्वाणि पानं पानीयमेव च।
तत्कल्पकैः समास्वाद्य प्राश्नीयाद्भोजनानि च॥ २७॥
Ibid. vii. v. 27.

3 भिषग्भेदेन वा शत्रुं रसदानेन साध्ययेत्॥ ७०॥
Ibid. IX. v. 70.

4 Mahāvāgga viii. 26, 6 & 8 (Sacred Books of the East).

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8. There are five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task—when he is capable of prescribing medicines; when he does know what (diet) is good and what is not good for the patient, serving what is good and not serving what is not good for him; when he deos wait upon the sick out of love, and not out of greed; when he does not revolt from removing evacuation, saliva or vomit; when he is capable of teaching, inciting, arousing and gladdening the patient with religious discourses. These are the five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task."

There is also good deal of evidence to show that medicines were distributed free to the poor and to the pious men. When Visakhā asked for eight boons of the Buddha, she mentioned amongst them the previlege of bestowing her life long "food for the sick, food for those who wait upon the sick and medicines for the sick" and explained her reasons as follows[1] :—

"9. Moreover, Lord, if a sick Bhikkhu does not obtain suitable foods, his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the diet that I shall have provided for the sick neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha my life long with diet for the sick.

Moreover, Lord, a Bhikkhu who is waiting upon the sick if he has to seek out food for himself, may bring in the food (to the invalid) when the sun is already far on his course, and he will lose the opportunity of taking his food. But when

[1] Mahāvāggā VIII, 15-9.

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he has partaken of the food I shall have provided for those who wait upon the sick, he will bring in food to the invalid in due time and he will not lose the opportunity of taking his food. It was this circumstances, Lord, that I had in view in desiring to provide the Saṁgha my life long with food for those who wait upon the sick.

10. Moreover, Lord if a sick Bhikkhu does not obtain suitable medicines his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the medicines which I shall have provided for the sick, neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Saṁgha, my life long with medicines for the sick."

The Edict No. II of Aśoka clearly shows that charitable institutions were common in India, during his reign. The Edict runs as follows :—

"Everywhere in the kingdom of the king Piyadasi, beloved of the gods, and also of the nations who live in the frontiers such as the Cholas, the Pandyas, the realms of Satyaputra and Keralaputra, as far as Tambapani, (and in the kingdom of) Antiochus, king of the Greeks and of the kings who are his neighbours, everywhere the king Piyadasi, beloved of the gods, has provided medicines of two sorts, medicines for men and medicines for animals. Wherever plants useful either for men or for animals were wanting they have been imported and planted. Wherever roots and fruits were wanting, they have been imported and planted. And along public roads, wells have been dug for the use of animals and men."

We also learn from Houen Tsang's account that Śilāditya II

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(610 - 650 A. D.) was inclined towards Budhism and he forbade the slaughter of living animals, built *stupas*, and "in all the highways of the towns and villages throughout India, he erected hospices, provided with food and drink, and stationed there physicians with medicines for travellers and poor persons round about, to be given without any stint."[1]

He also mentions about the father of the Bhikkhu Śrutaviṁśatikoṭi, that "from his house to the snowy mountains, he had established a succession of rest-houses, from which his servants continually went from one to the other. Whatever valuable medicines were wanted, they communicated the same to each other in order, and so procured them without loss of time, so rich was this family."[2]

He also mentions charitable institutions called Puṇyaśālās as common in India. "There were formerly in this country (Tsch-kia-Takka) many houses of charity (goodness or hppiness, Puṇyaśālās) for keeping the poor and the unfortunate. They provided for them medicines and food, clothing and necessaries; so that travellers were never badly off.[3]

Again he says: "Benevolent kings have founded here (Mo-ti-pil-lo or Matipura) a house of "merit" (Puṇyaśālās). This foundation is endowed with funds for providing choice food and medicines to bestow in charity on widows and bereaved persons, on orphans and the destitute."[4] A similar Puṇyāśālā or hospice was in K'ei-P'an-to (Kabandha).[5] In describing

[1] Beal's Record, Vol. I, p. 214.
[2] *Ibid*, Vol. II, p. 188.
[3] *Ibid*, Vol. I, p. 165.
[4] *Ibid*, Vol. I, p. 198.
[5] *Ibid*, Vol. II, p. 303.

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Multan he says: "They have founded a house of mercy (happiness), in which they provide food, and drink, and medicines for the poor, and sick, affording succour and sustenance."[1] Of Śilāditya he says: "Every year he assembled the Sramanas from all countries, and on the third and seventh days he bestowed on them in charity four kinds of Alms (*viz.*—food, drink, medicine, clothing)."[2]

Fa Hian (405-11 A.D.), a contemporary of Candragupta Vikramāditya, describes the charitable dispensaries in the town of Pāṭāliputra thus:—"The nobles and householders of this country have founded hospitals within the city to which the poor of all countries, the destitute, cripple and the diseased may repair. They receive every kind of requisite help gratuitously. Physicians inspect their diseases, and according to their cases order them food and drink, medicines or decoctions, every thing in fact that may contribute to their ease. When cured, —they depart at their convenience."[3] Smith remarks: "No such foundation was to be seen elsewhere in the world at this date; and its existence, anticipating the deeds of modern Christian charity, speaks well both for the character of the citizens who endowed it, and for the genius of the great Aśoka whose teaching still bore such wholesome fruit many centuries after his decease. The earliest hospital in Europe, the Maison Dieu of Paris, is said to have been opened in the 7th centuries."[4]

"Upatisso, son of Buddha Das, builds Hospitals for cripples,

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[1] Beal's Record, Vol. II, p. 274.
[2] *Ibid*, Vol. I, p. 214.
[3] *Ibid*, Vol. I, Intro. lcii.
[4] Smith's Early History of India, 2nd Ed., p. 280.

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for pregnant women, and for the blind and diseased.[1] Dhatushena builds Hospitals for cripples and sick[2]. Buddha Das[3] himself ordained a physician for every ten villages on the high road, and built assylums for the crippled, deformed and destitute."[4]

The animal Hospitals or Piñjrāpoles which still exist at Ahmedabad, Surat, and Sodepore in Bengal, and elsewhere may be regarded as the survivals of the institutions founded by the Maurya monarch. The following account of the Surat Hospital in the 18th century is from the pen of Hamilton:—

"The most remarkable institution in Surat is the Banyan Hospital, of which we have no discription more recent than 1780. It then consisted of a large piece of ground enclosed by high walls, and sub-divided into several courts or yards for the accommodation of animals. In sickness they were attended with the greatest care, and here found a peaceful assylum for the infirmities of old age.

"When an animal broke a limb, or was otherwise disabled, his owner brought him to the Hospital, when he was received without regard to the caste or nation of his master. In 1772 this hospital contained horse, mules, oxen, sheep, goats, monkies, poultry, pigeons, and variety of birds; and also an aged tortoise, which was known to have been there seventy-five years. The most extraordinary ward was that appropriated for rats, mice, bugs, and other noxious vermins for whom suitable food was provided."[5]

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[1] Mahāwanśo, p. 249.
[2] *Ibid*, p. 256.
[3] *Ibid*, p. 245.
[4] Cunningham's Bhilsa Topes, p. 54, foot note.
[5] Hamilton's Description of Hindustan (120) Vol. I, p. 718, quarto ed., Crooke. Things Indian, Art. Pinjrapole, (Murray 1906).

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We quote here from Hemādri the opinions of the sages and the Purāṇas as to the merit of the founder of a hospital[1] :—

Visvāmitra.

There is no gift more precious than the gift of cure; therefore it should be given freely to the sick to augment one's good fortune. He who gives medicines, diet, food, oil for smearing and shelter to the sick, becomes free from all diseases.

Samvartta.

The giver of medicines, oleaginous remedies and food for the cure of the sick, becomes free from all diseases, happy and long-lived.

Agastya.

Those who give rice and medicines freely attain happiness, being free from desease.

Saura Purāṇa.

He, who gives medicines to the sick to cure their diseases always remains healthy, long-lived and happy.

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[1] अथ आरोग्यदानं ।

तत्रारोग्यदानस्तव दुच्यते ।

आह विश्वामित्रः ।

आरोग्यदानात्परमं न दानं विद्यते क्वचित् ।
अतोदेयं रुजार्त्तानामारोग्यं भाग्यवृद्धये ॥
औषधं पथ्यमाहारं तैलाभ्यङ्गप्रतिश्रयं ।
यः प्रयच्छति रोगिभ्यः सभवेद्व्याधिवर्जितः ॥

संवर्त्तः ।

औषधं स्नेह-माहारं रोगिणां रोगशान्तये ।
ददानो रोगरहितः सुखी दीर्घायुरेव च ॥

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Nandi Purāna.

The high-souled man who gives the Brahmins collyrium in charity to cure the diseases of the eye, goes to the Sun (after death) and becomes free from eye deseases, fine-looking and fortunate.

Good health is a step to the acquirement of religious merit, wealth, pleasure and final emancipation, and so the man who bestows cure to the sick and also he who erects a hospital equipped with good medicaments, dresses, learned doctors, servants and rooms for students, always gain them. The doctor should be well-versed in the religious treatises, experienced, familiar with the actions of medicines, a discriminator of the colour of the roots of the herbals and well-acquainted with the

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अगस्त्यः ।

अन्नौ-षधप्रदातारः सुखं यान्ति निरामयाः ।

सौर पुराणे ।

रोगिणी रोगशान्त्यर्थमौषधं यः प्रयच्छति ।
रोगहीनः स दीर्घायुः सुखी भवति सर्व्वदा ॥

नन्दि पुराणे ।

अञ्जनं यो नरोदद्याद्चौर्व्याधिनिवृत्तये ।
विप्राय स पुमान् याति सूर्य्यलोकं महामतिः ।
आरोग्यनयनो दिव्यः सुभगो जायते नरः ॥

तस्मिन्नेव पुराणे ।

धर्म्मार्थ-काम-मोक्षाणां आरोग्यं साधनैर्युतः ।
अतस्त्वारोग्यदानेन नरो भवति सर्व्वदा ॥
आरोग्यशालां कुरुते महौषधपरिच्छदां ।
विदग्धवैद्यसंयुक्तां सत्यावसथसंयुतां ॥

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proper season of raising them from the ground, well-trained with the qualities of the juices, (their strength and actions), ṣāli rice, meat and medicaments, trained in compounding medicines, one who knows well of the physique of men by intelligence, one who knows the temparament and the qualities of the diet, a pathologist who is not idle, well acquainted with the remedial agents for the premonitary signs and sequelæ of diseases, proficient in the requirements of time and place, well-read in the medical text-books—the Ayurveda with its eight divisions and an expert in curing diseases by domestic remedies (prepared from handful of common ingredients).

The pious man who erects such a hospital in which the services of good physicians of this nature are retained, becomes celebrated as the virtuous, the successful and the intelligent

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वैद्यस्तु शास्त्रवित् प्राज्ञो दृष्टौषधपराक्रमः ।
औषधीमूलवर्णज्ञः समुद्धरणकालवित् ॥
रसवीर्य्यविपाकज्ञः शालिमांसौषधीगणे ।
योगविद्देहिनां देहं यो धिया प्रविगेदुधः ॥
धातुपथ्यमयज्ञश्च निदानविदतन्द्रितः ।
व्याधीनां पूर्व्वलिङ्गज्ञस्तदुत्तरविधानवित् ॥
देशकालविधानज्ञश्चिकित्साशास्त्रवित्तथा ।
अष्टाङ्गायुर्व्वेदवेत्ता मुष्टियोगविधानवित् ॥

अष्टावङ्गानि आयुर्वेदस्य ।

यथाशल्यं शालाक्यं कायचिकित्सा भूतविद्या कौमारभृत्यमगदतन्त्र रसायणतन्त्र वाजीकरणतन्त्रमिति सुश्रुतोक्तानि ।

एवं विधः शुभो वैद्यो भवेद्यत्राभियोजितः ।
आरोग्यशालामवन्तु कुर्य्याद्धीधर्म्मसंश्रयः ॥
स पुमान् धार्म्मिको लोके स कृतार्थः सबुद्धिमान् ।
सम्यगारोग्यशालायामौषधैः स्नेहपाचनैः ॥

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man in this world. If in such a hospital the kind-hearted man can cure a single patient of his maladies by simple medicines, oleaginous remedies and compounds of medicinal decoctions, goes to the Brahma's residence with his seven generations upwards. The rich and the poor acquire religious merit in proportion to the amount of riches they possess; where would the poor man get a hospital and a young physician to cure his diseases? The man secures the eternal regions mentioned before by rendering the sick healthy by the use of roots to some and by good rubbing (with external applications) to others. He who cures the sick suffering from an increase or decrease of the Air, the Bile and the Phlegm by simple remedies, he too goes to such blessed regions (after death) as are secured by those who perform many religious sacrifices (Yajñas).

व्याधिनं विरुजी कृत्य अप्येकं करुणायुतः।
प्रयाति ब्रह्मसदनं कुलसप्तकसंयुतः॥
आढ्यो वित्तानुसारेण दरिद्रः फलभाग् भवेत्।
दरिद्रस्य कुतः शाला आरोग्याय भिषग्युवा॥
अपिमूलैर कैनापि मर्दनाद्यैरथापि वा।
स्वस्थीकृते भवेन्मर्त्ये पूर्व्वोक्तं लोकमव्ययं॥
वात-पित्त-कफाद्यानां चया-पचयभेदिनां।
यस्तु स्वल्पाभ्युपायेन मोचयेत् व्याधिपीड़ितान्॥
सोपि याति शुभान् लोकान् अवाप्यान् यज्ञयाजिभिः।

स्कन्दपुराणे।

आरोग्य शालां यः कुर्य्यात् महावैद्यपुरस्कृतां।
सर्व्वोपकरणोपेतां तस्य पुण्यफलं शृणु॥
धर्म्मो-र्थ-काम-मोक्षाणामारोग्यं साधनं यतः।
तस्मादारोग्य दानेन तदुक्तं स्याच्चतुष्टयं॥
अर्थकामार्त्त विद्वांसं स्वस्थीकृत्य प्रयत्नतः।
प्राप्नोति सुमहत्पुण्यमनन्तं क्षयवर्जितं॥
ज्ञानयोगरतं शान्तं रोगार्त्तं शिवयोगिनं।
यः स्वस्थं कुरुते सोपि सर्व्वदानफलं लभेत्॥

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Skandapurāna.

Hear, the amount of religious merit secured by a man who erects a hospital containing all the necessary articles (of treatment) and in which are engaged eminent physicians by reward. As good health is the means of attaining religious merit, wealth, pleasure and final emancipation, therefore, he by rendering the sick healthy, gives these four blessings.

By carefully curing a learned man of his sickness great merit is secured, which is eternal and indestructible. He too who cures a sickman who is calm and absorbed in meditation of Siva and knowledge, attains the virtue of all kinds of gifts. Bramhā, Viśńu, all the gods, diseases, relatives and kings—they are obstacles to yoga but not to those who perform it (yogi). Whatever merit is obtained by the great, by supporting the sick Brāhmans (priests), Kshatriyas (warriors), and Biṭh (cultivators) and Sudras (servants), can not be obtained by the performance of all the great Yajñas (religious ceremonies). As even the gods can not reach the end of the

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ब्रह्मा विष्णु: सुरा: सर्व्वे व्याधय: खजना नृपा:।
योगस्यैते महाविघ्ना व्याधयस्ते न योगिनां * ॥
ब्रह्म-क्षत्रिय-विट्-शूद्रान् रोगार्त्तान् परिपाल्य च।
यत्पुण्यं महदाप्नोति न तत्सर्व्वैर्महाखै: ॥
आकाशस्य यथा नान्त: सुरैरप्युपलभ्यते।
तद्दारोग्यदानस्य नान्तोवै विद्यते क्वचित् ॥
पुण्येनानेन महता गत्वा शिवपुरं नर:।
मोदते विविधैर्भोगैर्व्विमानै: सर्व्वकामिकै:।
एकविंशत्कुलोपेत: सभृत्य: परिपालित:।
आस्ते शिवपुरे तावद्यावदाहूतसंप्लवं ॥
तत: स्वधर्म्मशेषेण संप्राप्त: प्रयत: सदा।
ज्ञानमुत्पद्यते तस्य रुद्रेभ्य: परिचारक: ॥

* स्वेन योगिनामिति वा पाठ:।

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firmament, so there is no end (to the merit) of the gift of cure. By this great merit, the man reaching the region of Siva enjoys himself by soaring in a balloon which can go to the various desired directions. With his twenty-one generations upwards and surrounded by his servants, he stays in the Siva's realm so long till deluge does not occur. There, after the lapse of his merit, the devoted servant acquires knowledge from Siva.

Abandoning this world by knowledge, abiding by the prayers to Siva, and casting away this body as a straw, he reaches beyond the limits of sorrow. Being freed from all sorrows, becoming pure, all-knowing and self-sufficient, and absorbed in his ownself, they are called the Liberated. Therefore to mitigate the diseases, the sick should be well nursed; the great sages should especially be attended to even by the sacrifice of one's body or riches. The wise must not irritate the weak patients, and they like the preceptors should be rescued constantly from sins. He who relieves the sick, by taking them under his care, reaches the other bank of this ocean of world.

ज्ञानाद्विरक्तः संसाराच्छिवध्यानमुपाश्रितः ।
स्वदेहं तृणवत्त्यक्त्वा सर्व्वदुःखान्तमाप्नुयात् ॥
समस्तदुःखनिर्म्मुक्तः शुद्धः स्वात्मव्यवस्थितः ।
सर्व्वज्ञः परिपूर्णश्च मुक्त इत्यभिधीयते ॥
तस्माद्भोगापवर्गार्थं रोगार्त्तं समुपाचरेत् ।
विशेषेण तु योगीन्द्रं शरीरेण धनेन च ॥
रोगिणो नोद्विजेत् प्राज्ञो दुर्ब्बलानपि सर्व्वदा ।
तान् पापाद्गुरुवन्नित्यमेवन्धर्म्मः प्रवर्त्तते ॥
योनुगृहीतमात्मानं मन्यमानो दिने दिने ।
उपसर्पेत रोगार्त्तस्तीर्णस्तेन भवार्णवः ॥

इत्यारोग्यदानं ।

Hemādri's Cāturvarga, Cintāmoni, Dāna Khaṇḍam. Asiatic Soc. Ed. Ch. XIII. P. 891—95.

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After these proofs, the statement of Mr. Ameer Ali that "the Arabs invented chemical pharmacy, and were the founders of those institutions which are now called dispensaries"[1] can not be accepted as correct.

DISPENSARIES.

As regards dispensaries, Suśruta advises the physician to construct his dispensary in a clean locality; and the building should face towards some auspicious direction as the east or the north. He says:—"The medicines should be kept in burnt earthen pots arranged on planks supported by stakes or pins".[2] This is still the method of storing medicines used by the *Kavirājas*. Dallvaṇa explains the passage thus:—"The medicines should be kept in pieces of cloth, earthen pots, wooden pots and Śaṅku (kīlaka)."[3] The former explanation is plausible for it is impossible to imagine how a kīlaka or stake can be a container of medicine, unless it is implied as a point of support for hanging the medicine vials from it.

Dr. Heyne (1814) thus describes the ancient dispensaries of the Hindus: "The place in which medicines are kept should

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[1] History of the Saracens p. 262, 1899.

[2] ग्लीतस्रङ्नाखण्डफलकशङ्कुविन्यस्तभेषजं
प्रशस्तायां दिशि शुचौ भेषजागारमिष्यते ॥
Suśruta Saṁhitā. I. xxxvii.

[3] गृहीतौषधसंस्थापनीपायं दर्शयन्नाह:,—ग्लीतेति। ग्लीत: कर्पटखण्डं, मृदा भाण्डं, मृत्भाण्डं। फलकं पट्टकं इति पुस्तकान्तरे पाठ:, शङ्कु: कीलक:, एतेषु ग्लीतादिषु विन्यस्तं धृतं भेषजं यस्मिन् गृहे तत् भेषजागारं भेषजगृहमिष्यते इति सम्बन्ध:। प्रशस्तायां दिशि पूर्व्वस्यामुत्तरस्यां वा, शुचौ देशे अस्मिन् भूमिप्रविभागीयाध्याये, निवन्धेषु व्यत्ययेन न पाठो दृश्यते। अस्माभिस्तु हृद्यक्रमरीत्यैव पाठो लिखित इति सर्व्वावयवसाध्येष्वित्यादि यावन्नवं द्रव्यं पुराणञ्चेति पाठं केचिदाचार्य्या न पठन्ति ॥
Dallvana's Commentary.

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be clean, dry, and not accessible to rats, white ants or dust. The drugs ought to be put in nets, or large pots, the mouth of which must be tied over with a piece of cloth, and suspended in a room. Fire, smoke and water must be kept at a distance.

The house in which medicines are stored, should be neither in too high nor too low a situation, and it should not be far distant from places in which medicines may be collected. Its front should face either the south or the north, with a convenient *viranda* before the door of the same side.

The necessary apparatus for mortars, scales, &c., must be kept in a place in the wall that has been consecrated for that purpose by religious ceremonies."

After describing the different classes, and members composing each class, of medicines, Suśruta continues: "The wise physician should collect and classify these medicines, and with them prepare external applications, infusions, oils, ghee, syrups, &c., as required for derangement of a particular humour. The medicines should be carefully preserved in all seasons, in rooms free from smoke, rain, wind and dust. The medicines should be used singly, or in combinations of several medicines of a class, or of an entire group, or of more than one group, according to the nature of the disease, and the extent of derangement of the humours."[1]

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[1] एभिर्लेपान् कषायांश्च तैलं सर्पींषि पानकान्।
प्रविभज्य यथान्यायं कुर्वीत मतिमान् भिषक् ॥
धूमवर्षानिलक्लेदैः सर्व्वर्त्तुष्वनभिद्रुते।
गृहयित्वा गृहे न्यस्येद्विधिनौषधसंग्रहं ॥
समीक्ष्य दोषभेदांश्च गणान् भिन्नान् प्रयोजयेत्।
पृथक्त्रिशाख् समस्तान् वा गणं वा व्यस्तसंहतं ॥

Suśruta Saṁhitā I. xxxviii.

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ANÆSTHETICS.

In the medical text books of the Hindus, there is no mention of a general anæsthetic, from which we can infer that it was unknown in those ancient days. There are, however, many indications to show that the earlier surgeons felt the necessity of such an agent to produce insensibility to pain. Both Caraka and Suśruta mention the use of wine to produce the desired effect. Caraka says: "After extraction of a dead fœtus before the full term of pregnancy, wine should be prescribed to her, for that will improve the condition of her uterus, make her happy and alleviate the pain of the operation."[1] Suśruta, however, distinctly lays down that "wine should be used before operation to produce insensibility to pain." He again remarks: "It is desirable that the patient should be fed before being operated on. Those who are addicted to drink and those who cannot bear pain, should be made to drink some strong beverage. The patient, who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation."[2]

The use of certain drugs to produce anæsthetic effects was well known to the ancient Greeks and Romans. Dioscorides

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[1] व्यपगतगर्भशल्यान्तु स्त्रियमासगर्भां सुराशौण्डनरिष्टमधुमदिरासवानामन्यतममद्ये सात्म्येत: पाययेत गर्भकोष्ठविशुद्ध्यर्थमर्त्तिविस्मरणार्थं प्रहर्षणार्थञ्च ॥

Caraka Saṁhitā, IV, viii.

[2] प्राक्शस्त्रकर्म्मणश्चैष्टं भोजयेदातुरं भिषक् ।
मद्यं पाययेन्मद्यं तीक्ष्णं यो ऽवेदनासहः ॥
न मूर्च्छत्यन्नसंयोगान्मत्तः शस्त्रं न बुध्यते ।
तस्मादवश्यं भोक्तव्यं रोगेषूक्तेषु कर्म्मणि ॥
प्राणो ह्याभ्यन्तरो नृणां बाह्यप्राणगुणान्वितः ।
धारयत्यविरोधेन शरीरं पाञ्चभौतिकं ॥

Suśruta Saṁhitā, I, xvii.

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mentions Mandragora (Mandragora Atropa) to have been employed internally as a hypnotic and anæsthetic. Pliny (32-79 A.D.) in his Natural History mentions that this anæsthetic was also used by inhalation; and this fact is corroborated by Galen, Arætæus, Celsus and others. The Arabian physicians also used it. The Chinese surgeons still use some powder (Indian hemp probably) to throw their patients into profound sleep. In the 13th century Theodoric (died 1298) described the "spongio somnifera" the vapours raised from which were capable, when inhaled, of setting patients into an anæsthetic sleep, thus inducing insensibility to the agony and torture of a surgeon's knife. Baptista also mentions his "Pomum somniferum", to be made with mandragora, opium, &c. The Hindus also inhaled the fumes of burning Indian hemp as an anaesthetic at a period of great antiquity. As early as 927, A. D., they also knew drugs which they employed for the same purpose, for Paṇḍit Vallāla, in his Bhoja Prabandha, alludes to a cranial operation performed on the King Bhoja after he was rendered insensible by some drug called Sammohinī (producer of unconsciousness). Another drug is also mentioned, Sañjībanī (restorer to life), by which he soon regained consciousness after the operation had been finished.[1]

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[1] ततस्तावपि राजानं मोहचूर्णेन मोहयित्वा शिरःकपालमादाय तत्करोटिकापुटे स्थितं शफरकुलं गृहीत्वा कस्मिंश्चिद्वाजने निक्षिप्य सन्धानकरण्या कपालं यथावदारचय्य सञ्जीवन्या च तं जीवयित्वा तस्मै तद्दर्शयताम्।

Bhoja Prabandha (Jibānanda's Edn.), P. 98.

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CHAPTER III.

MATERIALS OF INSTRUMENTS.

Iron and Steel.

In the Ṛgveda, *ayas*, (Latin aes), next to gold, is the metal most often referred to. *Ayas* often stands as a generic name to mean simply "metal," though in later works it signifies iron as a rule. The mention of dark and red *ayas* in the Atharva-veda indicates a distinction between iron and copper or bronze. The surgical instruments of the Hindus are recommended generally to be made of iron; but Suśruta allows other suitable material when iron of good quality is not available.[1] He says: "A wise surgeon should get the instruments made of pure iron and with sharp edges by an expert blacksmith who is skilful and experienced in his craft."[2] The use of impure iron as a material for surgical instruments, he deprecates as a defect and advises the surgeons not to rely on such instruments.

The Hindus were acquainted with steel and they knew how to turn out steel of fine quality from a pure iron ore. Nāgārjuna, the well known Buddhist chemist, wrote a scientific

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[1] तानि प्रायशो लौहानि भवन्ति तत्प्रतिरूपकाणि वा तदलाभे।

Suśruta Saṁhitā. I. vii.

[2] शस्त्राण्येतानि मतिमान् शुद्धैरेकायसानि तु।
कारयेत् करणैः प्राज्ञः कर्मारैः कर्मकोविदैः॥

Ibid, I. viii.

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treatise on steel and iron.[1] Śibodāsa in his commentary on Chakrapāṇi quotes Patañjali as an authority on the subject.[2] In the Dhanurveda, Vīracintāmaṇi, Śārañgadharapaddhati and Lohārnava, steel as a material of sword has been described and classified.

Dr. Mitra quotes some references[3] about the knowledge of iron possessed by the ancient Hindus from the Ṛgvida. He finds that "swords (II. 156), spears (IV. 25), javelins (II. 292), lances (I. 774), (IV. II. 288) and hatchets (I. 120) are frequently mentioned; and these weapons were bright as "gold" or golden (IV. 19), "shining bright" (I. 175), "blazing" (IV. 93), "sharp" (IV. 113) and "made of iron" (I. 226); they are "whetted on a grind stone" (II. 36) to improve their keenness (I. 150), and "polished to enhance their brightness" (II. 326)....."According to Nearchus, King Porus gave 30 lbs of steel to Alexander as the most precious present he could offer."

Royle also remarks[4]: "Working in metals they have long been famous for: their steel acquired so great celebrity at an

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[1] नागार्ज्जुनो मुनीन्द्र शशास यल्लोहशास्त्रमतिगहनम्।
तस्यार्थस्य स्मृतये वयमेतद्विशदाक्षरैर्ब्रूमः॥

Cakradatta, Rasāyanādhikāra.

[2] अर्च्चयित्वा विधानेन हेरम्बं गुरुभास्करौ।
लोकपालान् ग्रहांश्चैव क्षेत्रपालानथौषधम्।
आदित्यदेवताश्चेष्ट्वा धन्वन्तरी-पतञ्जली
दद्याद्बलिञ्च सर्व्वेभ्यो नानाभक्षोपचारतः॥

Quoted in Śibodas's commentary on Louhamārana-Vidhi in Cakradatta.

[3] Dr. R. L. Mitra's Indo-Aryans, Vol. 1, P. 301. See Wilson's Ṛgveda.

[4] Royle's Antiquity of Hindoo Medicine, Pp. 46-7.

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early period, as to have passed into a proverb among the Persians, where *fouladee hind* indicates steel of the best quality; and *juwabee hind*, an Indian answer, means a cut with a sword made of Indian steel."

Copper.

Pure copper was also used as a material of instruments; and vessels and instruments of copper are frequently mentioned in the medical books of the Hindus. A copper probe for applying antimony to the eye has been found in the excavations of Bijnor and another in the Bihat excavations. Cakradatta[1] advises us to use a copper probe for the application of *lekhana* collyrium; and suśruta mentions a copper needle in the operation for reclination of cataract.[2]

Tin.

Tin was also used as a material of blunt instruments. Suśruta mentions plates of tin to surround a tumour and to protect the healthy parts, before the application of actual cautery.[3] Such plates are recommended to be made of tin, or lead, or copper, or iron.

Lead.

Tubes of lead were used for purpose of fumigation. Probes made of lead were used for application of collyrium. The use

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[1] प्रशस्ता लेखने तास्त्री रोपने काललौहजा।

Cakradatta, Añjanadhikāra.

[2] तास्त्रायसी शातकौम्भी शलाका स्यादनिन्दिता।

Suśruta Saṁhitā, VI. xvii.

[3] अल्पावशिष्टे कृमिभिः कृते च लिखित्ततोऽग्निं विदधीत पश्चात्।
यदल्पमूलं तपुतास्त्रसीस पट्टैः समावेष्य तदायसैर्वा।
चाराग्निशस्त्राण्य सकृद्विदध्यात् प्राणाग्रहिंसनं भिषग्प्रमत्तः॥

Suśruta Saṁhitā, IV. xviii.

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of lead plates to sorround tumours before application of actual cautery has been noted above.

Bell-metal.

The use of bell-metal—an amalgam of zinc or tin and copper, 25 parts of the former with 75 parts of the latter,—as a material of probes for applying collyrium, is mentioned by Suśruta.[1]

Gold and Silver.

Gold was known to the Hindus from the remote antiquity; and among the metals, it is the one most frequently[2] mentioned in the Ṛgveda. Silver was perhaps unknown during the earlier Vedic age, from its name being not mentioned in the Ṛgveda. But no conclusion can safely be drawn from this argument[3]. We find, however, gold, silver, and other precious

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[1] सौवर्णं राजतं शार्ङ्गलाम्नं वैदूर्यकांस्यजं
आयसानि च यौज्यानि शलाकाश्च यथाक्रमं ॥
Suśruta Saṁhitā, VI. xviii.

[2] "निष्क ग्रीव"
Ṛgveda. 5 Mandala. 19 Sūkta.
"निष्केन सुवर्णेन अलङ्कृता ग्रीवा"।
Sāyana.
अश्वः न हैम्यावान्।
Ibid. 4 Mandala. 2 Sūkta.
"सुवर्णं निर्मित कल्यावान् अश्वः"।
Sāyana.
"A horse with golden caparisons"—Wilson.

[3] "एनीं रयिं"।
Ṛgveda. 5 Mandala. 33 Sūkta.
एनवर्णां श्वेतवर्णां रयिं धनं।
Sāyana.
"Query, if silver money be intended"—Wilson.

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stones mentioned as materials of instruments in the medical books. Gold and silver vessels and plates are often described in Sanskrit literature.[1] Suśruta mentions the use of drinking cups made of gold, silver and precious stones.[2]

Caraka, amongst other things necessary for a lying-in-room, mentions two needles of gold and silver.[3] To cut the navel-cord of the new-born child, he recommends a knife made of gold, or silver, or iron.[4] In the Manusaṁhitā[5] we find: "Before the section of the navel string, a ceremony is ordained on the birth of a male; he must be made while sacred texts are pronounced, to taste a little honey and clarified butter from a golden spoon."[6] A golden needle is mentioned by

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[1] सुवर्णरूप्यशङ्खाश्म शुक्ति रत्न मयानि च।
कांस्याय स्राव रैत्यानि एणसीस मयानि च।
निर्लेपानि विशुद्ध्यन्ति केवलेन जलेन तु॥

इति व्राचे।

[2] सौवर्णे राजते ताम्रे कांस्ये मणिमये तथा
पुष्पावतंसं भौमे वा सुगन्धि सलिलं पिबेत्॥

Suśruta Saṁhitā, I. xlv.

[3] * * * तीक्ष्णौ सूचीपिप्पलकौ सौवर्णराजतौ द्वे शस्त्राणि च तीक्ष्णायसानि।

Caraka Saṁhitā, IV. viii.

[4] नाभिवन्धनात् प्रभृति हित्वाष्टाङ्गुलमभिज्ञानं कृत्वा च्छेदनावकाशस्य द्वयोर्वन्तरयोः शनैर्गृहीत्वा तीक्ष्णेन रौक्मराजतायसानां छेदनानामन्यतमेनोर्द्ध धारेण छेदयेत्॥

Ibid.

[5] प्राङ् नाभिवर्धनात्पुंसो जातकर्म्म विधीयते।
मन्त्रवत्प्राशनं चास्य हिरण्यमधुसर्पिषाम्॥

Manusaṁhitā, II. 29.

[6] Manusaṁhitā (ch. II. V. 29. Jones's trans.)

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Suśruta for pricking the bulb of Soma plant to extract its juice.[1] To cure trichiasis, Cackradatta mentions a needle cautery of gold.[2] For destroying the hair follicles, he advises us to pass the hot needle into them as soon as the eyelashes are removed by epilation. In the Yogaratnākara, is mentioned a cautery of gold, to burn the fistuious track round the anus.[3] Śārṅgadhara mentions silver or coral pots for keeping medicated snuffs,[4] and gold and silver tubs for immersing patients in medicated lotions.[5]

HORN.

Horns of animals are mentioned as suction-apparatus. For

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1 * * * * सोमकन्दं सुवर्णसूच्यादिविदार्य्य पयोगर्द्धीयात् सौवर्णे पात्रेऽञ्जलिमात्रं * * * *

Suśruta Saṁhitā, IV. xxix.

2 प्रहृद्धान्तर्म्मुखं रोम सहिषीरुद्वरच्छनैः।
सन्दंशेनोद्धरेद्वह्व्यां पक्ष्मरोमाणि बुद्धिमान्।
रक्तन्नत्ति दहेत् पक्ष्म तप्तहेमशलाकया।
पक्ष्मरोगे पुननैवं कदाचिद्रोमसम्भवः॥

Cakradatta. Netraroga Cikitsā.

3 अपानमार्गपिटिकां दहेत् स्वर्णशलाकया।
अग्निप्रतप्तया पश्चात् कुर्य्यादग्निव्रणक्रियाम्॥

Yogaratnākara, p. 347. (Anandāsram Series).

4 कीर्णमच्छिन्नधारञ्च हेमतारादिशुक्तिभिः।
शुक्त्या वा पात्रे युक्त्या वा ग्रातैर्व्वा नस्यमाचरेत्॥

Śārṅgadhara Saṁgraha, III. viii.

5 सौवर्णं राजतं वापि ताम्रमायसञ्चदारुजं।
कीटकं तच्च कुर्व्वीतोच्चाये षठचिंशदङ्गुलं॥

Ibid, III. ii.

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this purpose, the horn of a cow is recommended.[1] A probe made of horn is advised to be used for applying collyrium. Suśruta mentions goat's horn to be used as a container of medicine.[2] He also recommends for this purpose vessels manufactured out of horn.[3] Similarly Caraka advises us to keep medicines in the lamb's horn.[4] Tubes of Vasti-yantra (clysters) are often described to be made of horn.[5]

Bone and Ivory.

Vāgbhaṭa II describes the aṅguli-trāṇaka or finger-guard to be made either of wood or ivory.[6]

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1 "चुषणे", विष पूयाद्या चूषण निमित्तं शरीरेषु युज्यते यत्, "शृङ्ग'" गवादि भवं शृषिरं शृङ्ग * * * * *
Vāgbhatārtha Kaumudī, I. xxv.

2 चुर्णाञ्जनं कारयित्वा भाजने मेषशृङ्गजे ॥
संस्थाप्यीभयत: कालमञ्जयेत् सतत बुध: ।
Suśruta Saṁhitā, VI. xv.

वंशे वा माहिषे शृङ्गे स्थापयेत् शोधित रसम् ।
Rasendra Cintāmaṇi. IX.

3 एतच्चूर्णाञ्जनं श्रेष्ठं निहित भाजने शुभे ।
दन्तस्फटिकवैदूर्य शङ्खशैलासनोद्भवे ।
शातकुम्भेऽथ शार्ङ्गे वा राजते वा सुसंस्कृते ॥
Suśruta Saṁhitā, VI. xix.

4 सिद्ध: शैलासने भाण्डे मेषशृङ्गे च संस्थित: ॥
Caraka Saṁhitā, VI. xxvi.

5 विसुद्रासं विखण्डाच्च धातुजां काष्ठजां तथा ।
षड़ङ्गुलीस्यां गोपुच्छां नाड़ीं युञ्जात् द्विहस्तिकां ॥
Śārṅgadhara Saṁgraha, III. ii.

6 अङ्गुलि त्राणकं दान्तं वार्चं वा चतुराङ्गुलं ।
Aṣṭāṅga Hṛdaya. I. XXV.

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WOOD.

To apply vapour-bath, Śārṅgadhara mentions tubes made of wood or metal.[1] Wooden Tubes for injections were also used.[2]

STONE.

Śārṅgadhara says: "The collyrium probes should be made either of stone or metal".[3] For compounding medicines, stone *khal* or mortar and pestles are mentioned. A big stone slab with a muller is recommended to be used for grinding dry or fresh vegetable medicines. In extracting the Soma juice, two slabs of stone are mentioned in the Ṛgveda.[4]

EXECUTION.

The execution of the instruments is said to have been all that can be desired. Suśruta says[5]: "They should be made just of the proper size with their ends rough or polished; they should be also strong, well-shaped and capable of a firm grasp." Again he continues: "When an instrument (has been selected) of

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[1] नेत्रानि धातुजान्याहुर्नल वंशादिजान्यपि ॥

Śārṅgadhara Saṁgraha, III. ix.

[2] नेत्रं कार्य्यं सुवर्णादिधातुभिर्वृक्षवेणुभिः ।
नलैर्दण्डैर्विषाणाग्रैः मणिभिर्या विधीयते ॥

Ibid, III. v.

[3] मुखयोः कुण्ठिता श्लक्ष्णा शलाकाष्ठाङ्गुलोन्मिता ।
अश्मजा धातुजा वा स्यात् कलायपरिमण्डला ॥

Ibid, III. xiii.

[4] Ṛgveda. 10 Mandala, 76, 94 & 175 Sūktas.

[5] समाहितानि यन्त्राणि खरश्लक्ष्णमुखानि च ।
सुदृढ़ानि सुरूपाणि सुग्रहाणि च कारयेत् ॥

Suśruta Saṁhitā, I. vii.

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a fine make and with an edge keen enough to divide the hairs on the skin, and when it has been firmly grasped at the proper place, only then it should be used in any surgical operation"[1]. And again: "A wise surgeon will get his instruments made of good iron and with sharp edges, by a blacksmith who is skilful and experienced in his craft."[2] Vāgbhaṭa also gives the same directions.[3]

Ornamentation.

In the absence of actual specimen, it is impossible to say whether there was any ornamentation on the surgical instruments of the Hindus. No ornamentation is described in the extant medical treatises. Only one instrument—Mucutī—is mentioned by Vāgbhaṭa II as being ornamented with a ring.[4]

Edges of Sharp Instruments.

Suśruta says[5]: "The edges of instruments, used in incising

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[1] यदा सुनिश्चितं शस्त्रं रोमच्छेदि सुसंस्थितं।
सुगृहीतं प्रमाणेन तदा कर्म्मसु योजयेत्॥
Ibid, I. viii.

[2] See foot-note 2, P. 61.

[3] षड्विंशतिः सुकर्मारैर्घटितानि यथाविधि।
शस्त्राणि रोमवाहीनि वाङ्मयेनाङ्गुलानि षट्॥
सुरूपाणि सुधाराणि सुग्रहाणि च कारयेत्।
अकरालानि सुभ्रातसुतीक्ष्णावार्त्ततेऽयसि॥
समाहितसुखायाणि नीलाम्भोजच्छवीनि च।
नामानुगतरूपाणि सदा सन्निहितानि च॥
Aṣṭāṅga Hṛdaya, I. xxv.

[4] सुवृटौ सूक्ष्म दन्तुर्मूले रुचकभूषणा।
Ibid.

[5] तत्रधारा भेदनानां मासूरी। लेखनानामर्द्धमासूरी।
व्यधनानां विस्रावणानाञ्च कैशिकी। छेदनानामर्द्धकैशिकीति॥
Suśruta Saṁhitā, I. viii.

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(as of Vṛddhipatra, Nakhaśastra, &c.) should be of the fineness of a masūra (Ervum Lens); of those used in scarifying (as Maṇḍalāgra &c.) of a half a masūra; of those used in puncturing (as Kuṭhārikā) and evacuating (as needles, kuśapatra, &c.) of a hair; and those used in dividing (as Vṛddhipatra), of half a hair". As to the Vaḍiśa or hook and the Dantaśaṅku or tooth-scalers, the former should have a curved end and a fine point, while the latter should have an end shaped like the first leaf of barley."[1]

The Tempering of Sharp Instruments.

Suśruta remarks[2] that "the instruments are tempered in three ways;—by immersing the heated *śastra* in an alkaline solution, or water, or oil. Those tempered in an alkaline solution are used in dividing bones and in excising arrows and other foreign bodies. Those tempered in water are used in incising, dividing or clearing muscles; and those tempered in oil are used in puncturing veins and dividing nerves and tendons."

As the methods of tempering the śastras are the same as those recommended for the arms of war, we quote from Vṛddha Śārṅgadhara (the elder), two methods of tempering arrow-heads and swords. He says[3]: "I shall describe the ways of tempering arrow-heads, by smearing them with a paste of

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[1] वड़िशो दन्तशङ्कुश्चानताग्रे तीक्ष्णकर्णकप्रथम यवपत्रमुखे।
Suśruta Saṁhitā, I. viii.

[2] तेषां पायना त्रिविधा चारीदकतैलेषु तत्र क्षारपायितं शरशल्यास्थिच्छेदनेषु। उदकपायितम् मांसच्छेदनभेदनपाटनेषु तैलपायितं सिराव्यधनस्नायुच्छेदनेषु।
Ibid.

[3] फलस्य पायनं वक्ष्ये वनौषधिविलेपनैः।
येन दुर्भेद्यवर्म्माणि भेदयेत् तरुपर्णवत्॥
Vṛddhya Śārañgadhara.

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vegetable drugs, which would thus acquire the power of piercing a coat-of-mail as easily as the leaf of a tree."

I.

"Make a paste of Pippalī (Piper Longum), rock-salt and Kuṣṭha (Saussurea Lappa) with cow's urine. These are to be well mixed until the paste becomes cold and yellow. The arrow-heads and other sharp cutting instruments are to be well smeared with that paste and then heated to redness. Then they are to be removed from the furnace and allowed to cool down to a state short of redness and dipped in oil. By this means, the iron acquires special power as a cutting instrument[1]".

II.

"Make a paste of the five kinds of salts,[2] mustard and honey. Let the instrument-maker smear it on the śastras which are then to be heated in a furnace. When the colours resembling those of a peacock's feather are displayed on the śastra, the burning is known to be adequate. The instrument is then dipped in water[3]".

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[1] पिप्पली सैन्धवं कुष्ठं गोमूत्रेन तु पेषयेत् ।
अतिशीत मनाविद्धं पीतं नष्टं तथौषधम् ॥
अनेन लेपयेच्छस्त्रं लिप्तं चाग्नौ प्रतापयेत् ।
ततो निर्व्वापितं तैले लौहं तच्च विशिष्यते ॥ Vṛddhya Śārṅgadhara.

[2] सौवर्चलं सैन्धवञ्च विड्मौद्भिदमेव च ।
सामुद्रेन सहैतानि पञ्चस्युर्लवणानि च ॥ Vaidyaka.

[3] पञ्चभिर्लवणैः पिष्टं मधुसिक्तः ससर्षपैः ।
एभिः प्रलेपयेच्छस्त्रं लिप्तं चाग्नौ प्रतापयेत् ॥
शिखिग्रीवानुवर्णाभं तप्तपीतं तथौषधं ।
ततस्तु विमलं तोयं पाययेच्छस्त्रमुत्तमम् ॥ Vṛddhya Śārṅgadhara.

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III.

The sage Uṣanās or Śukrācāryya thus describes[1] the tempering of swords in the Vṛhat Saṁhitā (Kern's trans. Ch. L.) :—

23. The fluid to imbrue a sword with, according to the precepts of Uśanās, is: blood, if one wishes for a splendid fortune; ghee, if one is desirous to have a virtuous son; water, if one is longing for inexhaustible wealth.

24. An approved mixture to imbrue the sword with, in case of one desirous to attain his object by wicked means, is: milk from a mare, a camel and an elephant. A mixture of fish bile, deer-milk, horse-milk, and goat-milk, blended with toddy, will make the sword fit to cut an elephant's trunk.

25. A sword first rubbed with oil, and then imbrued with an unguent compounded of the milky juice of the Calotropis, goat's horn, ink, dung from doves and mice, and afterwards whetted, is fit for piercing stone.

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1 वड़वोष्ट्रकरेणुदुग्धपानं
यदिपानेन समीहतेऽर्थसिद्धिं ।
ऋषपिण्डमृगाश्व वस्तदुग्धैः
करिहृत्सच्छिदये सतालगर्भैः ॥
आर्कं पयो हुडु विषाणमसीसमेतं
पारवतास्तु शकृता च युतं प्रलेपः ।
शस्त्रस्य तैलमधितस्य ततोऽस्य पानं
पश्चाच्छितस्य न शिलासु भवेद्विघातः ॥
चारे कदल्या मथितेन युक्तो
दिनौषिते पायितमायसं यत् ।
सम्यक् शितं चाश्मनि नैति भङ्गं
न चान्यलौहेष्वपि तस्य कौण्ठ्यम् ॥

Vṛhat Saṁhitā.

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26. An instrument imbrued with a stale mixture of potash of plantains with butter milk, and properly whetted, will not get crooked on a stone, nor blunted on other iron instruments.

Good and Bad Qualities of Surgical Instruments.

Suśruta says[1]: "The good points in an instrument are the following: it should have a well-made handle, affording a firm grasp; it should be made of iron of good quality; it should have a fine edge, a pleasant shape and a well-finished point; and it should not be dentated (except the saw)." He gives preference to the Śastras which are of good make and with a fine edge—so fine as to divide the hairs on the skin and whose handles can easily be grasped by the surgeon's hand.

On the other hand, he points out eight defects[2] of sharp instruments: they must not be bent, or blunt, or broken, or jagged, or too thick, or too thin, or too long, or too short. Instruments free from these defects should be used. The Karapatra or saw is the only exception, for being used for sawing bones, it requires a jagged or dentated edge. Vāgbhaṭa also mentions these defects.[3]

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[1] तानि सुग्रहाणि सुलोहानि सुधारानि सुरूपाणि सुसमाहितमुखाग्रयत्नकरालानि चेति शस्त्रसम्पत्।

Suśruta Saṁhitā, I. viii.

[2] तत्र वक्रं कुण्ठं खण्डं खरधारंमतिस्थूलमत्यल्पमतिदीर्घमतिह्रस्वमित्यष्टौ शस्त्रदोषाः। अतो विपरीतगुणमाददीतान्यत्र करपत्रात्तद्धि खरधारमस्थिच्छेदनार्थं।

Ibid.

[3] कुण्ठ-खण्ड-तनु-स्थूल-ह्रस्व-दीर्घत्व-वक्रताः।
शस्त्राणां खरधारत्वमष्टौ दोषाः प्रकीर्त्तिताः॥

Aṣṭāṅga Hṛdaya, I. xxvi.

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Suśruta enumerates twelve defects[1] of blunt instruments, viz., it may be too thick, or made of impure metal, or too long, or too short, or incapble of being grasped, or capable of being grasped (unevenly) partially, or bent, or made of too soft material, or of elevated ends, or it may have bent, loose, elevated, and weak pins, or be of weak ends, or of thin sides. These faults refer principally to the *Swastika yantras* or the cruciform instruments.

The Uses of Instruments.

Twenty four different kinds of operations[2] are said to be performed by the blunt instruments (Suśruta), viz.:—

1.	Nirghātana	... Extraction by moving to and fro. *e. g.* śalyanirghātanī.
2.	Pūraṇa ...	... Filling the bladder or eyes with oil.
3.	Bandhana ...	... Bandaging and binding by rope.
4.	Vyūhana ...	... 1. Raising up and incising a part for removing a thorn or 2. bringing together the lips of the wound.
5.	Vartana ...	... Contracting or curling up.

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[1] तत्रातिस्थूलमसारमतिदीर्घमतिह्रस्वमयाहिविषमयाहि वक्रं शिथिलमत्युन्नतं स्रदुकीलं स्रदुमुखं स्रदुपाशमिति द्वादश यन्त्रदोषाः ।

Suśruta Saṁhitā, I. vii.

[2] यन्त्रकर्म्माणितु निर्घातनपूरणवस्त्रनव्यूहनवर्त्तनचालनविवर्त्तनविवरणपीड़नमार्ग-विशोधनविकर्षणाहरणाच्चनीन्नमनविनमनभञ्जनीम्रथनाचूषणैषणदारणर्जूकरणप्रचालनप्रधमन-प्रमार्ज्जनानि चतुर्विंशतिः ।

Ibid.

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6.	Cālana ...	... 1. transferring, i.e., removing from one part to another; 2. moving a foreign body.
7.	Vivartana	... Turning round.
8.	Vivaraṇa	... Exposing or opening out any part.
9.	Piḍana ...	... Pressing as by finger to let out pus from an abcess.
10.	Mārga Viśodhana	... Clearing the canals such as the urethra, rectum &c.
11.	Vikarṣaṇa	... 1. Extraction by pulling; or 2. loosening a foreign body fixed in muscles &c.
12.	Āharaṇa ...	... Pulling out.
13.	Āñcana ...	... Pulling up.
14.	Unnamana	... Elevating or setting upright as the depressed cranial bones or ears.
15.	Vinamana	... Depression as of the elevated ends of the fractured bone.
16.	Bhañjana	... 1. Rubbing the head, ears &c.; 2. contusing a part all round before it is surgically operated on.
17.	Unmathana	... Probing or stirring the track formed by an impacted foreign body.
18.	Ācuṣaṇa	... Suction as of poisoned blood and milk by horns, or gourd, or mouth.

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19.	Eṣaṇa ...	... Exploring as by an earth-worm shaped probe, the direction of a sinus or the existence of a foreign body in the wound.
20.	Dāraṇa ...	... Splitting or dividing as the head, ears &c.
21.	Ṛjukaraṇa	... Straightening anything which is bent.
22.	Prakṣālana	... Washing as a wound with water.
23.	Pradhamana	... Blowing as powders into the nose through tubes.
24.	Pramārjana	... Rubbing out as foreign bodies from the eyes &c.

Vāgbhaṭa recognises only fifteen different kinds[1] of operations performed by the blunt instruments: Nirghātana (moving to and fro), Unmathana (probing), Pūraṇa (filling up), Mārga Śuddhi (clearing passages), Saṁvyūhana (raising up and extracting a thorn by incision), Āharaṇa (pulling out), Bandhana (bandaging), Pīḍana (pressing), Ācūṣaṇa (suction), Unnamana (elevation), Nāmana (depression), Cāla (movement), Bhaṅga (breaking), Vyāvartana (turning round); and Ṛjukaraṇa (straightening).

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[1] निर्घातनोन्मथन पूरण मार्गशुद्धि
संव्यूहनाहरण बन्धन पीड़नानि।
आचूषणोन्नमन नामन चाल भङ्ग
व्यावर्त्तनर्जुकरणानि च यन्त्रकर्म्म॥

Aṣṭāṅga Hṛdaya, I. xxv.

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The śastras or cutting instruments, on the other hand, are said to perform eight kinds of surgical operations (Suśruta).[1]

1. Chedana ... ... Excision or removal of a part of the body by operation as of piles.

   Instruments:—Vṛddhipatra, nakhaśastra, mudrikā, utpalapatra, and arddhadhāra.

2. Bhedana ... ... Incision of a part, as of an abscess.

   Instruments:—The same as above.

3. Lekhana ... ... Scarification or dissection of a skin-flap; or scraping, as of Rohini *i.e.*, surgical diseases of the throat.

   Instruments:—Maṇḍalāgra and karapatra.

4. Vedana or Vyādhana ... Puncturing as of veins to bleed patients by instruments having fine points.

   Instruments:—Kuṭhārikā, vrīhimukha, ārā, vetaspatra, and sūcī.

5. Eṣaṇa ... ... Probing, as of sinus and fistula by a probe.

   Instruments:—Eṣaṇī.

6. Āharaṇa. ... ... Extraction, as of stone by the spoon or hook.

   Instruments:—Vaḍiśa, and danta-śaṅku.

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[1] तत्र शास्त्रकर्म्माऽष्टविधं। तद्यथा। छेद्यं भेद्यं लेख्यं वेध्यमेष्यमाहार्य्यं विस्राव्यं सीव्यमिति।

Suśruta Saṁhitā, I. v.

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7. Viśrāvaṇa ... To let out pus as from a deep-seated abscess.

Instruments:—Sūcī, kuśapatra, ātīmukha, śarārīmukha, antarmukha, trikurccaka, and eṣaṇī.

8. Sīvana ... ... Stitching, as of the lips of a wound by needles.

Instruments:—The different kinds of sūcī or needles.

Caraka mentions, however, six kinds[1] of operations:—

1. Pātana ... ... Incision, as in operation for sinus, abscess, intestinal injury, and deeply impacted foreign bodies.

2. Vyādhana ... Tapping or piercing, as in operations for ascites, suppurating tumour, ovarion tumour, boils &c.

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[1] पाटनं व्यधनञ्चैव च्छेदनं लेपनं तथा।
प्रोच्छनं सीवनञ्चैव षड्विधं शस्त्रकर्म्म तत्॥
नाड़ीव्रणाः पक्वशोथास्तथा चतगुदोदरम्।
अन्तःशल्याश्च ये देशाः पाठ्यास्ते तद्विधाश्च ये॥
दकोदराणि संपक्वा गुल्माः ये ये च रक्तजाः।
व्यधाः श्लीपितरोगाश्च वीसर्पपिड़कादयः॥
उदवृत्तान् स्थूलपर्य्यन्तानुत्सन्नान् कठिनान् व्रणान्।
अर्शःप्रभृत्यधीमांसं छेदनेनोपपादयेत्॥
किलासानि मुकुष्ठानि लिखेल्लेख्यानि बुद्धिमान्॥
वातासृग्ग्रन्थिपिड़काः सकीटा रक्तमण्डलाः।
कुष्ठान्यभिहितञ्चाङ्गं शोथांश्च प्रच्छयेद्विषक्॥
सीव्यं कुक्ष्युदराद्यन्तु गम्भीरं यदिपाटितं।
इति षड्विधमुद्दिष्टं शस्त्रकर्म्म मनीषिभिः॥

Caraka Saṁhitā, VI. xiii.

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3. Chedana ...	...	Excision, as in the operation for tumours, raised and thickened *vraṇo* or corns, and piles.
4. Lekhana ...	...	Scraping, as in operation for some varieties of skin diseases.
5. Pracchana	...	Scarifying, as in the operations for glands, boils, leprous nodules, inflammatory swellings, &c.
6. Sībana ...	...	Sewing, as in the operation of laparotomy for deep seated diseases in the abdomen.

Vāgbhaṭa describes thirteen kinds[1] of operations performed by the sharp instruments :—

1. Utpātana	...	Raising up by incision, as by the Nakhaśastra.
2. Pātana	...	Incision as by the Vṛddhipatra.
3. Sīvana	...	Stitching as by the Sūcī.
4. Eṣaṇa	...	Probing as by the Eṣaṇī.
5. Lekhana	...	Scraping as by the Maṇḍalāgra.
6. Pracchana	...	Scarification as by the Maṇḍalāgra.
7. Kuṭṭana	...	Pricking as by the Sūcī in tattooing.
8. Chedana	...	Excision as by the Vṛddhipatra.

[1] उत्पाट्य पाट्य सीव्यैष्य-लेख्य-प्रच्छन्न कुट्टनम् ।
छेद्यं भेद्यं व्यधो मन्थो ग्रहो दाह्य तत्क्रियाः ॥
Aṣṭāṅga Hṛdaya, I. xxvi.

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9.	Bhedana	... Piercing as by the Sharp Eṣaṇī.
10.	Vyadhana	... Tapping as by the Vetasapatra.
11.	Manthana	... Churning as by the Khaja.
12.	Grahaṇa	... Fixing as by the Sandaṁśa.
13.	Dahana	... Burning as by the rods.

Whetstone.

In the Ṛgveda we find the use of stones mentioned for whetting the edges of the arms of war.[1] The Hindu surgeons used a stone slab for sharpening the śastras or edged instruments.[2] It was of the colour of māṣa (Phaseolus Roxb.). The whetstones used by the Greeks and Romans were either the marble ointment slabs, or made of clay slate or sandy schistaceous shale.

Instrument Cases.

To preserve the edges of the cutting instruments, a case made of the wood of śalmālī (Bombax Malabaricum) was used (Suśruta).[3] Such cases were also manufactured of canvas, or wool, or silk, or leather. These cases—twelve *aṅguli* (*i.e*, fingers' breadth) long and nine *aṅguli* broad—were well sewn and

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[1] See Ṛgveda, Mandala. 2 Sūkta. 39 Verse 7.
" 9 " 90 " 1.
" 9 " 112 " 2.
" 10 " 53 " 9.
" 19 " 101 " 2.

[2] तेषां निशानार्थं श्लक्ष्णशिला माषवर्णा।

Suśruta Saṁhitā, I. viii.

[3] धारसंस्थापनार्थं शाल्मली फलकमिति।

Ibid.

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consisted of compartments, lined with wool and seperated by partitions for each instrument. They could be folded, closed with a rod and firmly tied by a knot.[1] The barbers of India still use similar cases for their instruments.

That the razor used to be kept in a case, we know from a passage in the Vṛhadāraṇyaka (800 to 500 B. C.) where the author says "It (the Atman) is here all-pervading down to the tips of the nail. One does not see it any more than a razor hidden in its case or fire in its receptacle".[2]

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[1] स्यान्नवाङ्गुलि विस्तारः सुघनो द्वादशाङ्गुलः।
चौम पट्टीर्ण कौषेय दुकूल रुद्र चर्म्मजः॥
विन्यस्त पाशः सुस्यूतः सान्त रीर्णास्थ शस्त्रकः।
शलाका पिहितास्य श्च शस्त्रकोषः सुसञ्चयः॥

Aṣṭāṅga Hṛdaya, I. xxvi.

अथ शस्त्राणां सुरचनार्थं शस्त्रकोष माह स्यादित्यादि। नवाङ्गुलिविस्तारः नवाङ्गुल परिमानविस्तारविशिष्टः शस्त्रकोषः स्यात्। शस्त्रस्य कोषः शस्त्रकोषः। कोष चाप् इति लोके। यथा असिकोष इत्यादि। तथा सुष्ठु, घनो, निविड़ः सुघनः तथा द्वादशाङ्गुलः दैर्घ्येण द्वादशाङ्गुल परिमानः, तथा चौमादिजः। तथा विन्यस्तः यथा क्रमेण कृतः पाशो यस्य स विन्यस्तपाशः। तथा सुष्ठु, स्यूतः कृत सेवनः, सुस्यूतः तथा सान्तरार्णि सव्यवधानानि, ऊर्णास्थानि मेषादिलोममध्येस्थितानि, शस्त्रानि यस्मिन् स सान्तरीर्णास्थशस्त्रकः। तथा शलाकया पिहितं स्थगितं आस्यं मुखं यस्य स शलाकापिहितास्य तथा सुष्ठु सञ्चयो, नापित भाण्डिकवद्राशीकरणं यस्य स सुसञ्चयः। चौमं अतसीसूत्रभववस्त्रं केन्विस् ख्यातः। दुकूलशब्दः पट्टादिभिः स्त्रिभिः सम्बध्यते। तेन पट्टदुकूलं पाट् इति ख्यातेन सूत्रेन निर्म्मितं वस्त्रं ऊर्ना, मेषादिलोम तद्भवं वस्त्रं और्ण दुकूलंवनात् इत्याख्य वस्त्रादि। कौषेयदुकूलं कोषकार-कीटभव सूत्रेण रेशम् इति ख्यातेन निर्म्मितं वस्त्रं।

Vāgbhaṭārtha Kaumudī.

[2] Vṛhadāraṇyaka, I. iv.

Macdonell's Sanskrit Literature, p. 22.

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To prove that portable cases for medicaments and instruments were in use in ancient India, we quote *in toto* from the Mohāvāgga some references to them.[1]

Boxes for Ointments, Ointment Pots, and Portable Cases.

Now at that time, the Bhikkhus used to put pulverised ointments into pots and saucers. They became sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a box for ointment".

Now at that time the K*h*abbaggiya Bhikkhus used to carry about various kinds of boxes for ointments—gold ones and silver ones. People were annoyed, murmured and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of boxes for ointments, gold ones, and silver ones, are not, O Bhikkhus, to be used. Whosoever does so, is guilty of a dukka*ṭa* offence. I allow, O Bhikkhus, the use of such boxes made of bone, or ivory, or horn, or of the na*ḷa* reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of bronze, or of the centre of the chank-shell (Sankhu-navi)."

2. Now at that time the boxes of ointment had no lid. (The ointment) was sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

[1] Mohāvāgga vi. 12. (Sacred Books of the East).

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"I allow you, O Bhikkhus, the use of a lid."

The lid used to fall off.

"I allow, O Bhikkhus, to fasten the lid with thread and tie it on to the box."

The boxes used to fall.

"I allow you, O Bhikkhus, to sew the boxes on with thread".

3. Now at that time the Bhikkhus used to rub ointment on with their fingers, and the eyes were hurt.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a stick or holder to put the ointment on with".

Now at that time the *Kh*abbaggiya Bhikkhus used to keep various kinds of ointment-sticks—gold ones, and silver ones. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world".

They told this thing to the Blessed One.

"Various kinds of ointment-holders, O Bhikkhus, are not to be used. Whosoever does so, is guilty of a dukka*ṭa* offence. I allow, O Bhikkhus, the use of ointment-holders of bone, or of ivory, or of horn, or of the na*ḷa* reed, or of bambu, or of wood, or of lac, or of fruit, or of bronze, or of the chank-shell."

4. Now at that time the ointment-sticks used to fall on the ground and become rough.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a case for the ointment-sticks".

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Now at that time the Bhikkhus used to carry the ointment-boxes and ointment-sticks about in their hands.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a bag to put the ointment-box in."

They had no shoulder strap.

"I allow you, O Bhikkhus, the use of a shoulder strap (by which to carry the ointment-box), or of a thread (by which to sew or tie it on)."

13.

1. Now at that time the venerable Pilindava*kkha* had head-ache.

"I allow, O Bhikkhus, the use of a little oil on the head".

(The disease) became no better.

"I allow, O Bhikkhus, the practice of taking up (medicine) through the nose". (See commentary on the Dhammapada, pp. 83.)

The nose ran.

"I allow, O Bhikkhus, the use of a nose-spoon" (Natthu-kara*ni*).

Now at that time the *Kh*abbaggiya Bhikkhus had various kinds of nose-spoons—made of gold, and of silver. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

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"Various kinds of nose-spoons, O Bhikkhus, are not to be used. Whosoever does so, is guilty of dukkaṭa offence. I allow, O Bhikkhus, the use of such nose-spoons made of bone, (&c., as in chap. 12, 1, down to:) the chank-shell.

2. The nose took up the medicament in unequal proportions.

"I allow, O Bhikkhus, the use of a double nose-spoon (yamaka-natthu-karaṇî)."

They used to spread the drugs on a wick before they sniffed up the aroma: and their throats got burnt.

'I allow, O Bhikkhus, the use of a pipe to conduct the aroma.'

Now at that time the Khabbaggiya Bhikkhus had various kinds of pipes (&c., as in the last clauses of § 1, down to the end).

Now at that time the aroma-pipes came open: and worms got in.

'I allow, O Bhikkhus, the use of a lid to the pipes.'

Now at that time the Bhikkhus carried the pipes about in their hands.

'I allow, O Bhikkhus, the use of a bag to carry the aroma-pipes in'.

The aroma-pipes rubbed against one another.

'I allow, O Bhikkhus, the use of a double bag.'

They had no shoulder strap.

'I allow, O Bhikkhus, the use of a shoulder strap (by which to carry the double bag), or of a thread (by which to sew it on).

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Operation Table.

In the examination for piles, Suśruta directs the patient to lie down on his bed or on a board[1]; and in describing the operation, Vāgbhaṭa II mentions a board to be used as an operationtable.[2] A similar bed, as long as the distance from the top of the head to the knees of the patient, is also mentioned in the discription of the lithotomy operation.[3] The use of a board as a fracture bed is also advised.

For passing the tubes of the *vasti-yantra* or clysters into the urethra in the male, the patient is recommended to sit on a stool as high as his knees (*jānumātrāsana*).[4]

In phlebotomy, the patient is advised to sit on a stool, an aratni high[5] (*i.e.* the distance between the tip of the olecranon process of the ulna to the tip of the little finger).

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[1] भुक्तवन्तमुपवेश्य सम्यृते शुचौ देशे साधारणे व्यभे काले समे फलके शय्यायां वा प्रत्यादित्य-गुदमन्यस्योत्सङ्गे निषण्णपूर्व्वकायमुत्तानं * * * * *

Suśruta Saṁhitā, IV. vi.

[2] शुचिं कृतस्वस्त्ययनं भुक्तविस्रुतमव्यथम्।
शयने फलके वान्यनरोत्सङ्गे व्यापश्रितम्॥

Aṣṭāṅga Hṛdaya, VI. viii.

[3] ततो वलवन्तमविकृवमाजानुसमे फलके प्रागुपवेश्य पुरुषञ्च तस्योत्सङ्गे निषण्णपूर्व्वकाय-मुत्तानमुन्नतकटीकं।

Suśruta Saṁhitā, IV. vii.

[4] स्नातस्य भुक्तभक्तस्य रसेन पयसापि वा।
सृष्टविस्रूचवेगस्य पीठे जानुसमे सदा॥

Caraka Saṁhitā, VIII. ix.

[5] तत्र व्यधसिरं पुरुषं प्रत्यादित्यमुखमरत्निमात्रीच्छ्रिते उपवेश्यासने।

Suśruta Saṁhitā, III. viii.

अग्रितापातपखिन्नो जानूच्चासनसंस्थितः।
सदुपष्टात्तकेशान्तो जानुस्थापितकर्पूरः॥

Aṣṭāṅga Hṛdaya, I. xxvii.

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KAPĀTA-ŚAYANA OR FRACTURE-BED.

In the treatment of fractures of the lower extremities, mention is made of the *kapāta-śayana* (*lit.* door-bed) or fracture-bed, consisting of a plank of wood resembling the panel of a door.[1] The patient is to lie down on it. The board has five rods fixed to it, to which the fractured limb is tied to prevent any movement: two on each side of the joint and one on the plantar surface of the foot. Dallaṇa explains it thus[2]: In fractures of the bones of the leg, two rods are fixed on each side of the ankle and one supports the foot; in fracture of the thigh bone, two rods are fixed on each side of the knee or hip, and one under the foot. In a double fracture of the thigh bone and bones of the

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[1] अथ जङ्घोरुभग्नानां कपाटशयनं हितं।
कीलका बन्धनार्थञ्च पञ्च कार्य्या विजानता।
यथा न चलनं तस्य भग्नस्य क्रियते तथा।
सन्धेरुभयतो द्वौ द्वौ तले चैकञ्च कीलकः।
श्रोण्यां वा पृष्ठवंशे वा वक्षस्यूरुकयोस्तथा।
भग्नसन्धिविमोक्षेषु विधिमेनं समाचरेत्॥

Suśruta Saṁhitā, IV. iii.

[2] जङ्घोरुभङ्गेषु पश्चात् कर्म्मविशेषं निर्द्दिशन्नाह। अथ जङ्घेत्यादि। जङ्घोरुभग्नचिकित्सितमाह। भग्नानाम् काण्डभग्नानाम्। द्विविधानामपीत्यपरे। कपाटशयनमवश्यं कार्य्यम्। चलनम् कपाट शयनेनैव सह देशान्तरनयनार्थम्। आधारभूतशयनचालनार्थमित्यन्ये। आधेयभूतशरीरावयवचलन परिहारार्थं कीलाः। कीलानां पञ्चसंख्यात्वम्। जङ्घोर्व्वोर्द्वयोरेकतरस्य भग्नमवेक्ष्य तत्र जङ्घाभग्ने तु गुल्फसन्धेरुभयतो द्वौ एकञ्च तले एवं पञ्च। ऊरुभग्ने जानुसन्धेरुभयतो द्वौ द्वौ। वङ्क्षणसन्धेरुभयतस्तले चैक इत्यत्रापि पञ्च। उभयभङ्गापेक्षया तु सप्तभिरेव कीलैर्यन्त्रणम्। तथाह उभयतो बहिर्द्वौ गुल्फयोर्द्वौ च जानुनोः द्वौ च वङ्क्षणयोः तले चैक एवं सप्त। अत्र जङ्घोर्व्वोः पार्श्वयोर्व्वौ द्वौ तले चैकञ्च कीलक इति केचित् पठन्ति। तन्निबन्धकारैर्न पठितम्। तस्मान्न पठनीयम्। गयदासस्त्वत्र पाठान्तरं किमपि पठति। तच्चाभावान्न लिखितम्।

Dallaṇa's Commentary, IV. iii.

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leg, seven rods are required,—two on the outer side of the ankle, knee, and groin, respectively, and one under the foot. The fracture-bed is recommended to be similarly availed of in fractures and dislocations of the loin, the spinal column, the chest, and the clavicle. And this mode of treatment, he adds, may advantageously be used for the other kinds of fractures and dislocations. Vāgbhaṭa II also mentions it in the treatment of fractures[1].

Hippocrates used a similar fracture-bed for the proper treatment of fractures and dislocations. It was called Scammum Hippocratic or bench of Hippocrates. As the figures of of this bench would elucidate the structure of the *kapāṭa-śayana*, we reproduce here three plates with their explanations given at the end of Vol. II, Genuine Works of Hippocrates (Syed. Soc.Ed.), and two plates—Scammum Hippocratis and Plinthium Nilcii from the Collection De chirurgiens Grecs.

Fig. 1. The Scammum Hippocratis *or* Bench of Hippocrates, as represented by Andreas a Cruce (*Officina chirrugica venetiis*, 1596).

Fig. 2. The same as represented by M. Littré.

A. A board, 6 cubits long, 2 broad and 12 inches thick; not 13 as incorrectly stated by M. Littré.

B. The feet of the Axles, which are short.

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[1] कटौ जङ्घोरुभग्नानां कपाटशयनं हितम्।
यन्त्रणार्थं तथा कीलाः पञ्च काष्ठा विबन्धनाः॥
जङ्घोर्वोः पार्श्वयोर्द्वौ द्वौ तले एकश्च कीलकः।
श्रोण्यां वा पृष्ठवंशे वा वक्षस्याचक्रयोस्तथा॥

Aṣṭāṅga Hṛidya, VI. xxvii.

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CC. Axle-trees.

DD. Grooves 3 inches deep, 3 broad, seperated from one another by 4 inches.

E. A small post *or* pillar, fastened in the middle of the machine in a quadrangular hole.

F. Pillars a foot long.

G. A cross-beam laid on the pillars FF, which can be placed at different heights by means of holes in the pillars.

Fig. 3. Representation of the mode of reducing dislocation of the thigh outwards, as given by M. Littré (Œuv. d'Hipp., tom. iv, p. 305).

A mistake in the figure given by M. Littré is here corrected.

A. A lever applied to the nates of the luxated side, and acting from without inwards, in order to bring the head of the bone into its cavity.

B. Another lever, held by an assistant, put into one of the grooves of the machine, and intended to act against lever A.

C. Grove in which the end of the lever A takes its point of support.

D. The luxated member.

EE. Extension and counter-extension.

Fig. 4. Banc d'Hippocrate, d'après Rufus, servant à réduire différentes luxations. (Collection De Chirurgiens Grecs, Bibliothèque Nationale).

Fig. 5. Plinthium, ou cadre de Nileus, d'après Héliodore. (Ibid).

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CHAPTER IV.

The Number of Surgical Instruments.

The armamentarium of the Hindu surgeons consisted of a good number of surgical instruments. They are described to be of two kinds, the *yantras* and the *śastras, i.e.*, the blunt and the sharp instruments. Suśruta enumerates no less than one hundred and one varieties of the blunt instruments, and twenty different kinds of sharp instruments. Hārīta, on the other hand, enumerates twelve blunt instruments, twelve sharp instruments, and four prabandhas, as necessary for the operation of extraction of arrows and other foreign bodies.[1] Vāgbhaṭa II mentions one hundred and fifteen kinds of blunt and twenty-six kinds of sharp instruments. Pālakapya (Treatment of Elephants) mentions ten kinds of *śastras* or sharp instruments though he describes the uses of other instruments required for the surgical treatment of diseases.

Instruments and their Classification (Suśruta.)

Of the one hundred and one varieties of the blunt instruments, the surgeon's hand is rightly considered as the principal instrument, for without its help, no instrument can properly be used, and every surgical operation is under its control.[2] They are recommended to be used for the extraction

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[1] द्वादशैव तु यन्त्राणि शस्त्राणि द्वादशैव तु ।
चत्वारि च प्रबन्धानां शल्योद्धारे विनिर्द्दिशेत् ॥

[2] यन्त्रशतमेकोत्तरमव हस्तमेव प्रधानतमं यन्त्राणामवगच्छ । किं कारणं । यस्माद्धस्ताद्दते यन्त्राणांमप्रवृत्तिरेव तदधीनत्वाद्यन्त्रकर्म्मणां ।
तत्र मनःशरीराबाधकराणि शस्त्राणि तेषामाहरणोपायौ यन्त्राणि ।

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of *śalya* or foreign bodies, *e.g.*, a dart, an arrow, a javelin, a spear, a peg, a pin, a bamboo rod, a stake &c. which cause pain to the body and mind.

A. Suśruta subdivides the blunt instruments into six classes,[1] viz.:

I.	Svastika or cruciform instruments	... 24 kinds.
II.	Sandaṁśa or pincher-like ...	... 2 „
III.	Tāla or picklock-like ...	... 2 „
IV.	Nāḍī or tubular or hollow ...	... 20 „
V.	Śalākā or rod or pricker-like ...	... 28 „
VI.	Upayantra or accessory ...	... 25 „
		101

These instruments are advised to be made generally of iron, or of other suitable materials, when iron is not available. Their ends often resemble the faces of some ferocious beasts, or of deers, or birds. Hence the instruments should be so constructed as to have the likeness of their faces, following at the same time the directions of scientific treatises, or the instructions of teachers, or in imitation of other instruments, or in adaptation to the exigencies of the time. They should be of reasonable

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[1] तानि षट्प्रकाराणि। तद्यथा। स्वस्तिकयन्त्राणि। सन्दंशयन्त्राणि। तालयन्त्राणि। नाड़ीयन्त्राणि। शलाकायन्त्राणि। उपयन्त्राणिचेति। तत्र चतुर्विंशति स्वस्तिकयन्त्राणि। द्वे सन्दंशयन्त्रे। द्वे एव तालयन्त्रे। विंशतिर्नाड्यः। अष्टविंशतिः शलाकाः। पञ्चविंशति रूपयन्त्राणि।

Suśruta Saṁhitā, I. vii.

Hessler translates the terms as follows: *Uncinata* instrumenta, *forcipum* instrumenta, *palmiformia* instrumenta, *hamata* instrumenta, *secundaria* instrumenta.

Hessler's Suśruta, I. vii.

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size, with their ends rough or smooth as required. They should be of strong make, good shape and capable of a firm grasp.[1]

I. The Svastika or Cruciform instruments are—

1. Siṁhamukha. 2. Vyāghramukha. 3. Vṛkamukha. 4. Tarakṣumukha. 5. Ṛkṣamukha. 6. Dvīpimukha. 7. Mārjāramukha. 8. Śṛgālamukha. 9. Airvvārukamukha 10. Kākamukha. 11. Kaṅkamukha. 12. Kuraramukha. 13. Cāsamukha. 14. Bhāsamukha. 15. Śaśaghātīmukha. 16. Ulūkamukha. 17. Cillimukha. 18. Gṛdhramukha. 19. Śyenamukha. 20. Krauñcamukha. 21. Bhṛṅgarājamukha. 22. Añjalikarṇamukha. 23. Avabhañjanamukha, and 24. Nandimukhamukha.

II. The Sandaṁśa or pincher-like instruments are—

1. Forceps with arms.
2. Forceps without arms.

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[1] तानि प्रायशो लौहानि भवन्ति तत्प्रतिरूपकाणि वा तदलाभे। तत्र नानाप्रकाराणां व्यालानां खगपक्षिणां मुखेसुं खानि यन्त्राणां प्रायशः सदृशानि तस्मात्तत्सारूप्यादागमादुपदेशादन्ययन्त्रदर्शनादुक्तितश्च कारयेत्।

समाहितानि यन्त्राणि खरश्लक्ष्णमुखानि च।
सुदृढानि सुरूपाणि सुग्रहाणि च कारयेत्॥

Suśruta Saṁhitā, I. vii.

अनेकरूपकार्थ्याणि यन्त्राणि विविधान्यतः।
विकल्प्य कल्पयेद् बुद्ध्या यथास्थूलन्तु वक्ष्यते॥

* * * * *

अलौहान्यनुशस्त्राणि तान्येवञ्च विकल्पयेत्।
अपराण्यपि यन्त्रादीन्यपयोगञ्च यौगिकम्॥

Aṣṭāṅga Hṛdaya, I. xxv.

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III. The Tāla or picklock-like instruments are—

1. Ekatāla.
2. Dwitāla.

IV. The Nāḍī or tubular instruments are—

For fistula-in-ano ...	(1) with one slit; (2) with 2 slits ...	2
For piles ...	(1) with one slit; (2) with 2 slits ...	2
For wounds ...	... ...	1
For clysters (Rectal) ...	(Some authors describe 3 only) ...	4
For clysters (vaginal and urethral)...	(male and female) ...	3
For Hydrocele ...	... ...	1
For Ascites ...	... ...	1
For fumigation and inhalation	...	3
For Urethral Stricture	... ...	1
For Rectal ,,	... ...	1
For Cupping—gourd	... ...	1
		20

V. The Śalākā or rod-shaped instruments are—

Gaṇḍūpadamukha or earth-worm like ...	2
Śarapuṅkhamukha or arrow-stem like ...	2
Sarpafaṇamukha or snake's hood like ...	2
Vaḍiśamukha or fish-hook like ...	2
Masūradalamukha or masūra pulse like ...	2
Promārjana or swabs	6
Khallamukha or spoons	3
Jāmvavavadana or jambul seed like ...	3
Aṅkuśavadana or goad like	3
Kolāsthidalamukha or plum seed like ...	1
Mukulāgra or bud shaped	1
Mālatīpuṣpavṛntāgra or like the stem of mālatī flower	1
	28

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VI. The Upayantra or accessory instruments are—

1. Rajju—thread. 2. Veṇikā—twine. 3. Paṭṭa—bandages. 4. Carma—leather. 5. Valkala—bark of trees. 6. Latā—creepers. 7. Vastra—cloth. 8. Aṣṭhīlāśma—stone or pebble. 9. Mudgara—hammer. 10. Pāṇipādatala—palm of the hand and sole of the foot. 11. Aṅguli—finger. 12. Jihvā—tongue. 13. Danta—tooth. 14. Nakha—nail. 15. Mukha—mouth. 16. Vāla—hair. 17. Aśvakaṭaka—the ring of a horse's bridle. 18. Śākhā—branch of a tree. 19. Ṣṭhīvana—spittle. 20. Pravāhaṇa—fluxing the patient. 21. Harṣa—objects exciting happiness. 22. Ayaṣkānta—a loadstone. 23. Kṣāra—caustic. 24. Agni—fire. 25. Bheṣaja—medicines.

B. The sharp instruments or śastras are—

1. Maṇḍalāgra or round headed knife.
2. Karapatra or saw (*lit.* like the human hand).
3. Vṛddhipatra (*lit.* like the leaf of vṛddhi—an unknown medicinal plant)—a razor.
4. Nakha-śastra or nail-parer.
5. Mudrikā or finger-knife (like the last phalanx of the index finger).
6. Utpalapatra, a knife, *i.e.*, resembling the petal of a blue lotus, (Nymphaea stellata., Willd).
7. Arddhadhāra or a single-edged knife.
8. Sūcī—needles.
9. Kuśapatra—a knife shaped like the kuśa grass (Eragostris Cynosuroides).

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10. Ātīmukha—a knife shaped like the beak of the Ātī bird (Turdus Ginginianus).

11. Śararī-mukha—a pair of scissors like the beaks of Śararī bird.

12. Antarmukha (*lit.* having internal sharp edge)—a kind of scissors.

13. Trikurccaka—an instrument consisting of three needles.

14. Kuṭhārikā—a small axe shaped instrument.

15. Vrīhimukha—a trocar shaped like a grain of rice.

16. Arā or awl.

17. Vetasa-patraka—an instrument shaped like the leaf of a rattan (Calamus Rotang).

18. Vaḍiśa—an instrument shaped like the fish-hook.

19. Dantaśaṅku or tooth-pick.

20. Eṣani or sharp probe-like instrument.

According to Hārīta[1] the twelve blunt instruments are—

1. Godhāmukha or iguana-faced. 2. Vajramukha—gṛdhra-mukha? 3. Tribaktra or three faced. 4. Sandaṁśa or pincher.

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[1] गोधामुखं वज्रमुखं त्रिवक्त्रं नाम सन्दंशचक्राकृतिकङ्कपादम्।
अथानकं शङ्खकुक्कुलञ्च श्रीवत्ससौवत्सिक पञ्चवक्त्रं।
द्वादशैतानि यन्त्राणि कथितानि भिषग्वरैः।
अथ शस्त्राणि प्रोक्तानि नामानि च पृथक् पृथक्।
अर्द्धचन्द्रं व्रीहिमुखम् कङ्कपत्रं कुठारिका।
करवीरकपत्रञ्च शलाककरपत्रकम्।
वड़िशं शतपादञ्च शूली च सूचिमुद्गरम्।
शस्त्राण्येतानि प्रोक्तानि शल्योद्धारे पृथक् पृथक्॥

Hārīta Saṁhitā, III. lvi.

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5. Cakrākṛti or circular shaped. 6. Anaka? 7. Kaṅkapāda? 8. Śṛṅga or horn. 9. Kundala? 10. Śrībatsa? 11. Saubatsika? 12. Pañcabaktram, *i.e.*, five faced—simhamukham?

The twelve sharp instruments of Hārīta are—

1. Arddhacandra or half-moon shaped. 2. Vrīhimukha. 3. Kaṅkapatra. 4. Kuṭhārikā. 5. Karavīrakapatraka. 6. Śalākā or sharp probe. 7. Karapatraka or saw. 8. Vaḍiśa or sharp hook. 9. Gṛdhrapāda? 10. Śūlī 11. Sūcī or needle. 12. Mudgara or hammer?

Vāgbhaṭa II classifies the instruments in the following way:-

A. Blunt instruments—

I. Svastika, as heron, lion, bear, crow, deer forceps &c.				24
II. Sandaṁśa: It consists of two iron blades soldered at one end, the other ends being free				2
(*a*) for extraction of eyelashes &c. ...	1			
(*b*) mucuṭī ...	1			
III. Tāla				2
(*a*) Ekatāla	1			
(*b*) Dwītāla	1			
IV. Nāḍī or tubular:				23
(*a*) Kaṇṭhaśalyāvalokinī or throat speculum having three and five holes ...		2		
(*b*) Śalyanirghātanī		1		
(*c*) For piles, different sizes for male and female		6		
For inspection: 2 holes—rectal speculum	2			
For medication: 1 hole	2			
For applying pressure: entire—śāmī ...	2			

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(*d*) For fistula-in-ano: with one and two holes 2

(*e*) For nasal polypus &c. 1

(*f*) Aṅguli-trāṇaka or finger-guard ... 1

(*g*) Joni-vraṇekṣaṇa or vaginal speculum ... 1

(*h*) Vrāṇo vasti or wound syringe ... 1

(*i*) For dakodara or Paracentesis abdominis 1

(*j*) Vastiyantra or clysters: rectal, vaginal and urethral 3

(*k*) For fumigation... 1

(*l*) Cupping instruments: Alābu, Ghaṭīyantra and Horns 3

—

23

V. Śalākā or rod-like instruments ... 34

(*a*) Gaṇḍūpadamukha or earth-worm shaped 2

(*b*) Masūradalabaktra 2

(*c*) Śaṅku 9

Faṇībaktra or snake's hood ... 2

Śarapuṅkamukha 2

Vaḍiśa or blunt hook 2

Garvaśaṅku or delivery hook ... 1

Aśmarī or lithotomy hook ... 1

Śarapuṅkamukha or tooth extractor ... 1

(*d*) For wiping out discharges ... 6

For rectum 2

For nose 2

For ears (karṇaśodhana) 2

(*e*) For application of actual and potential cauteries 11

Jāmvobouṣṭha, three for each ... 6

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	Arddhendu or half-moon shaped, for hernia	1	
	Kolāsthidala for nasal polypus ...	1	
	Nail-shaped	3	
(*f*)	For cleansing		3
	Rectum	1	
	Vagina	1	
	Urethra	1	
(*g*)	Collyrium probe		1
			34

VI. Anuyantra or accessory instruments are nineteen in number. To the list of Suśruta he adds the following[1] :—

Goat's gut, silk, time, suppuration, and fear.

B. The sharp instruments of Vāgbhaṭa are twenty-six in number.[2]

1. Mandalāgra. 2. Vṛddhipatra. 3. Utpalapatra. 4. Adhyarddhadhāra. 5. Sarpāsya. 6. Eṣaṇī:—Gaṇḍūpadamukhā and Sūcīmukhā. 7. Vetasa. 8. Śarārī. 9. Trikurccaka. 10. Kuśapatra 11. Ātīvadana. 12. Antarmukha and Arddhacandrānan. 13. Vrīhibaktra. 14. Kuṭhārī. 15. Kuravakasalā. 16. Aṅguliśastra. 17. Vaḍiśa. 18. Karapatra. 19. Kartarī. 20. Nakhaśastra 21. Dantalekhana. 22. Sūcī. 23. Kurcca. 24. Khaja. 25. Ārā. 26. Karṇavedhanī.

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[1] अनुयन्त्राण्ययस्कान्त रज्जु वस्त्राऽश्म मुद्गराः ।
पट्टान्त्र जिह्वा वालाश्च शाखा नख मुख द्विजाः ॥
कालः पाकः करः पादोभयं हर्षश्च तत् क्रियाः ।
उपायवित् प्रविभजेदालोच्य निपुणं धिया ॥

Aṣṭāṅga Hṛdaya. I. xxv.

[2] षड्विंशतिः सुकर्मारैर्घटितानि यथाविधि ।
शस्त्राणि रोमवाहीनि वाहुल्येनाङ्गुलानि षट् ॥
सुरूपाणि सुधाराणि सुग्रहाणि च कारयेत् ।
अकरलानि सुध्मात सुतीक्ष्णावार्त्ततेऽयसि ॥

Ibid. I. xxvi.

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Bhāvamiśra mentions the following blunt and sharp instruments: Eṣanī, Jāmvoustha Śalā,[1] Sūcī[2] and knives generally in making incisions which should be shaped like Kharjjūrapatrika, (like the leaf of Kharjjūra tree, Phœnix Sylvestris, Roxb.) Arddhacandra, Candravarga, Sūcīmukha and Abāṅmukha.[3]

Pālakapya[4] mentions ten kinds of śastras :—1. Vṛddhipatra. 2. Kuśapatra. 3. Mandalāgra. 4. Vrīhimukha. 5. Kuṭhārī. 6. Vatsadanta. 7. Utpalapatra. 8. Śalākā. 9. Śūcī or needles. 10. Rampaka. Besides these he refers to Vaḍiśa.

Of the blunt instruments he mentions:—Jāmvobouṣṭha—(four in number, for application of actual cauteries), Siṁhadaṁṣṭrā, Godhāmukha, Kaṅkamukha, Kuliśamukha—(for extraction of foreign bodies), Eṣaṇī or probes (three), wound syringe, Vastiyantra, Śalākā or rods, yaṣṭhiyantra, Karkataka, Dyātūha, Makaraka (crocodile), Śārddūlamuṣṭhika (tiger's claws), Nandimukha (Turdus Ginginianus).

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[1] एषणा गतिमन्विष्य चारसूत्रानुसारिनीम्।
सूचीं निदध्यादत्यन्ते ग्रीन्नाभ्याश्च विनिर्हरेत्॥
Bhāva Prakāśa. II. iv., Nāḍī Vraṇādhikāra.

[2] आगन्तुजे भिषग्गाढ़ीं शस्त्रेणोत्कृत्य यत्नतः।
जाम्बोष्ठीनाग्निवर्णेन तप्तया वा शलाकया॥
Ibid. Bhagandarādhikāra.

[3] गतिमन्विष्य शस्त्रेण छिन्द्यात् खर्ज्जूरपत्रिकम्।
चन्द्राङं चन्द्रवर्गञ्च सूचीमुखमवाङ्मुखम्॥
Ibid.

[4] तत्र शस्त्राणि दशनामसंस्थानानि भवन्ति। तद्यथा ऋद्धिपत्रम्, कुशपत्रम्, मण्डलाग्रम्, व्रीहिमुखम्, कुठाराकृति, वत्सदन्तम्, उत्पलपत्रम्, शलाका, सूची, रम्पकश्चेति। फालजाम्बवतापिकादय्याकृतयश्चेति। एतान्याग्निकर्म्मविधाने चत्वारि चान्यानि शल्योद्धरणानि यथायोगं सिंहदंष्ट्रं गोधामुखं काङ्कमुखं कुलिशमुखं चेति। तिस्र एषणयः।
Hastī Āyūrveda, III. xxx.

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CHAPTER V.

Description of the Blunt Instruments.

Now we shall describe the instruments in detail. The Yantras or the blunt instruments will be considered first, and next the Śastras or the sharp instruments.

I. The Svastika yantra or Cruciform Instruments.

The word svastika is a technical term signifying one of the twenty-four signs of the Jinas; and it can be represented by two lines crossing each other, the arms of the cross being bent at their extremities towards the same direction. So these instruments may be described as cruciform. They have, as a rule a length of eighteen aṅguli. Their ends should be shaped like the faces of the following ferocious beasts (1 to 8), dear (9), and birds (10 to 24), and the instruments are to be called after their names.[1] They are divided into two classes; the instruments of class I resemble the mouths of lion (siṁha) and tiger (vyāgra), while class II comprises the instruments which have the likeness of the faces of birds of prey. The fulcrums of these instruments which are at the middle, are of the size of a masūra (Ervum lens). The handles are either rounded off, or bent at an angle at their ends, like an elephant driver's goad—the object being to afford a good grasp of the instrument by the surgeon's hands. The svastika instruments are used for the extraction of

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[1] तत्र स्वस्तिकयन्त्राण्याष्टदशाङ्गुलप्रमाणानि सिंहव्याघ्रवृकतरक्षुऋक्षद्वीपिमार्जारशृगालमृगैर्व्वारुककाककङ्कुररचासभासशशघात्यलूकचिल्लिश्येनगृध्रक्रौञ्चभृङ्गराजाञ्जलिकर्णावभञ्जननन्दिमुखमुखानि मसूराकृतिभिः कीलैरवबद्धानि मूलेऽङ्कुशवदावृत्तवारङ्गाण्यास्थिविनष्टशल्योद्धारणार्थमुपदिश्यन्ते ।

Suśruta Saṁhitā, I. vii.

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foreign bodies impacted in the bones.[1] If the foreign body is visible, extract it by the lion forceps or similar forceps of class I. If it is invisible, it should be extracted by the Heron forceps or similar forceps of class II. Of all the varieties of svastika instruments, the Heron forceps (kaṅka-mukha) is the best, for it can be easily introduced and turned in all directions, and also it grasps firmly and extracts a foreign body with ease and can be applied without any harm to all parts of the body.[2]

Class I:—

1. Siṁhamukha svastika or Lion-faced forceps:—this instrument is said to have its mouth shaped like that of a lion (Felis leo). It is the principle instrument of the class I. It is

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[1] तुल्यानि कङ्कसिंहर्क्षकाकादिमुखपक्षिणां ।
मुखैर्मुखानि यन्त्राणां कुर्यात्तत् संज्ञकानि च ॥
अष्टादशाङ्गुलयामान्यायसानि च भूरिशः ।
मसूराकारपर्यन्तैः कण्ठेवद्धानि कीलकैः ॥
विद्यात् स्वस्तिक यन्त्राणि मूलेऽङ्गुशनतानि च ।
ते दृढ़ैरश्मिसंलग्न शल्याहरणमिष्यते ॥

Aṣṭāṅga Hṛdaya. I. xxv.

[2] दृश्यं सिंहमुखाद्यैस्तु गूढ़ं कङ्कमुखादिभिः ।
निर्हरेत्तु शनैः शल्यं शास्त्रयुक्तिव्यपेक्षया ॥
विवर्त्तते साध्ववगाहते च शल्यं निगृह्णीद्धरते च यस्मात् ।
यन्त्रेष्वतः कङ्कमुखम् प्रधानं स्थानेषु सर्व्वेष्वधिकारि चैव ॥

Suśruta Saṁhitā I. vii.

निवर्त्तते साध्ववगाहते च
याह्यं गृहीत्वोद्धरते च यस्मात् ।
यन्त्रेष्वतः कङ्कमुखं प्रधानं
स्थानेषु सर्व्वेष्वधिकारि यच्च ॥

Aṣṭāṅga Hṛdaya. I. xxv.

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curious that in modern times, the European surgeons use a pair of forceps called the Lion forceps for holding bones firmly during operations. So the Makaramukha of Pālakapya is the Crocodile forceps.

2. Vyāghramukha or Tiger forceps: the mouth of this instrument is like that of a tiger (Tigris regalis).

3. Vṛkamukha or Wolf forceps (Canis lupus).

4. Tarakṣumukha or Hyena forceps (Hyena striata).

5. Ṛkṣamukha or Bear forceps (Ursus Americanas).

6. Dwīpimukha or Panther forceps (Felis pardus).

7. Mārjāramukha or Cat forceps (Felis domestica).

8. Śṛgālamukha or Jackal forceps (Canis aureas).

9. Airbbāruka or Deer forceps (Cervus elephas).

Class II:—The birds, in imitation of whose faces the instruments of this class are made, can be identified from the following discription of their beaks :—

Birds: 1. Raptatories : they have curved beaks hooked at the extremity.

(*a*) Strigidæ...owls...strong hooked beaks bent down from base.

(*b*) Vulturidæ...vultures...long straight beaks bent down at tip.

(*c*) Accipetridæ...falcons, osprey and eagle...short, usually dentated beaks, hooked at the ends.

2. Pessaries...(*a*) Lanidæ...shrike...hooked and strongly serrated beak. (*b*) Cervidæ...crow and blue-jay...beaks strong, thick, somewhat curved anteriorly and slightly notched.

3. Grallatories...Heroidæ or Ardeidæ...herons and krauñca...they have long and powerful beaks with sharp hard

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edges, somewhat curved at the point, rarely spoon-shaped, with long neck.

The instruments are—

10. Kākamukha or Crow forceps (Corvus corone).
11. Kaṅkamukha or Heron forceps (Ardea cenerea).
12. Kuraramukha or Osprey forceps (Pandion haliæctus).
13. Cāsamukha or Blue-jay forceps (Garrulous or Corvus cristatus).
14. Bhāsamukha or Eagle forceps.
15. Śaśaghātīmukha or Hawk forceps (Nanclerus furcatus).
16. Ulūkamukha or Owl forceps (Strix flammea).
17. Cillimukha or Kite forceps (Milivus ictimus).
18. Śyenamukha or Vulture forceps (Vulture cinereas).
19. Gṛdhramukha or Falcon forceps (Peregine falcon).
20. Krauñcamukha (Ardea jaculator); or Curlew (Numenius Arquatus).
21. Bhṛṅgarājamukha or Fork-tailed or Butcher-bird forceps (Lanius excubitor).
22. Añjalikarṇamukha—birds not identified.
23. Avabhañjanamukha „ „ „
24. Nandimukhamukha (Turdus Ginginianus).

II. The Sandaṁśa or Pincher-like Forceps.

The second class of instruments—the Sandaṁśa[1] or pincher-like forceps—comprises only two instruments: the forceps with and without handles. The first variety is likened

[1] सनिग्रहोऽनिग्रहश्च सन्दंशौ षोड़शाङ्गुली भवतस्त्वग्मांससिरास्नायुगतशल्योद्धारणार्थ-मुपदिश्यते ।

Suśruta Saṁhitā I. vii.

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to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates :[1] "Duae forcipes denticulata et non denticulata".

The sandaṁśas are used for the purpose of extracting foreign substances from the soft structures of the human body, such as the skin, muscles, veins, nerves, and tendons[2]. Generally they have a length of sixteen aṅguli.

Vāgbhaṭa II mentions two other instruments as modifications of the type :—

(*a*) One variety has the length of six aṅguli. It is intended for the purpose of extracting minute foreign bodies such as thorn, hair &c. and of removing the superfluous eyelashes.[3]

Cakrapāṇi also advises us to use a sandaṁśa for epilation, which may be called the Epilation forceps.[4]

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[1] Hessler's Suśruta. Caput vii. P. 14.

[2] कौलवद्व द्वियुक्तायौ सन्दंशौ षोड़शाङ्गुलौ ।
त्वक्सिरास्नायुपिशित लग्न शल्यापकर्षणे ॥ ५ ॥
Aṣṭāṅga Hṛdaya, I. xxv.
अतिगूढ़च्च शल्यच्च सन्दंशेन समुद्धरेत् ।
Hārīta Saṁhitā, III. lvi.

[3] षड़ङ्गुलोऽन्योहरणे सूक्ष्म शल्यो पपक्ष्मणां ॥ ६ ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[4] See foot-note 2, p. 66.

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Similarly in modern times, we remove superfluous eyelashes by the Epilation forceps. Mr. Berry writes[1]:—"When the trichiasis is only partial, a temporary improvement is obtained by epilation. In some cases where a few eyelashes only have been left altogether, the patient may procure for himself a pair of forceps, and have the eyelashes removed whenever they cause irritation." Surgical epilation was frequently necessary for trichiasis among the Romans and a similar forceps was in use there.[2]

In ancient times in India, the barbers used epilation forceps for pulling out grey hairs. In Makha-deva jātaka, we find the following conversations between the king and his barber[3]:—

"Barber. There is a grey hair to be seen on your head, O King.'

King. Pull it out, then, friend, and put it in my hand.

So he tore it out with golden pinchers, and placed it in the hand of the King."

(*b*) The second variety is known as the Mucuṭī instrument.[4] It is a pair of straight forceps, having no curve like that of the sandaṁśa. It is serrated finely at the open ends. The soldered end has a ring attached to it as ornamentation. It is recommended to be used for removing painful sloughs and proud granulations from a deep-seated abscess. It is also to be used to

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[1] Practical Ophthalmology, 1904. By G. A. Berry, M.B. P. 52.

[2] Paulus Ægineta. VI. xiii. (Syd. Soc. Ed.)

[3] Rhys David's Buddhistic jātaka stories, Vol. I, pp. 187.

[4] मुचुटी सूक्ष्म दन्तर्जुमूले रुचकभूषणा।
गम्भीर व्रणमांसार्त्ती चार्म्मणः शोषितस्य च ॥ ७ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Suśruta calls it Mucuṇḍī[1], and uses it to hold the pterygium after it has been raised by vaḍiśa or hook. It must be then a smaller variety of mucuṭī.

A similar pair of forceps, Dr. Erichsen mentions, and says[2] that "for the purpose of extracting needles, thorns, splinters of wood and other foreign bodies of small size and pointed shape lying in narrow wounds, forceps with very fine but strong, well-serrated points will be found useful."

Suśruta mentions baṁsabidala[3] or bamboo forceps. It is made of a piece of bamboo rod, split longitudinally into two halves nearly to its whole extent. This is like the bamboo tongs used by the smokers in Bengal to raise glowing charcoal to the earthen bowl. It should be used to remove worms from the surface of the human body.

The sandaṁśa instrument may be compared with the modern dressing forceps and with the forceps still used by the goldsmiths, known as a sonnā. Those with arms have their counterpart in the sāḍāsī or a pair of pinchers, still used by the blacksmiths.

III. Tāla Yantra or Picklock-like Instruments.

The third class of blunt instruments is called Tāla-

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[1] अपाङ्गं प्रेक्षमाणस्य वडिशेन समाहितः।
मुचुण्ढ्यागृह्य मेधावी सूचीसूत्रेण वा पुनः॥

Suśruta Saṁhitā, vi. xv.

[2] Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342.

[3] तानतुलिनाभ्यक्तस्य वंशविदलिनापहरेत्।

Suśruta Saṁhitā, IV. xxvii.

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yantra[1]. The word tāla "has been differently intepreted by the commentators. Bhānumatī gives the alternative reading (tālu *i.e.*, palate) for tāla, so the instruments likely had their ends shaped like the palatine process of fish. Dallana,[2] however, maintains that tāla means picklock, the ordinary Indian key which resembles a hook. Two of these are joined at one end, the curved ends being kept free, facing one another. The instrument would then resemble the face of a bhetuli fish. Instruments with one tāla or hook resemble one lip of the fish, and those with two tālas represent its entire face. Both Cakrapāṇi and Dallana however prefer to mean by tāla, the scale of a fish."

They have a length of twelve aṅguli, and are shaped like the jaws of a fish. They may be made either with a single blade (ekatāla) or with double blades (dvitāla) soldered at one end, the hooked ends being free. They are intended for the purpose of extracting foreign bodies from the ear, nose and other outer canals of the body. The ear scoop now used by the barbers of India for extracting wax from the ear is a tālayantra.

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[1] तालयन्त्रे द्वादशाङ्गुले मत्स्यतालुवदेकतालद्वितालके कर्णनासानाड़ीशल्यानामाहरणार्थे।

Suśruta Saṁhitā, I. vii.

द्वे द्वादशाङ्गुले मत्स्यतालुवद्वैक तालके।
ताल यन्त्र स्मृते कर्णनाड़ी शल्यापहारिणी॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] अत्र ताल-शब्देन प्रदेश उच्यते। एतेन एकं तालं प्रदेशो यस्य तदेकतालं, द्वे तालं प्रदेशौ यस्य तत् द्वितालकम्; एतेन मत्स्यस्य शल्कवत्प्रतनुमुखैरप्रदेशं एकतालं मत्स्यशल्कवत् प्रतनुमुखं द्विप्रदेशं द्वितालमित्युक्तम्। परिणाहस्तु कर्णादिप्रवेशो ज्ञेयः। अन्ये तु मत्स्यतालकवदेकतालकद्वितालके इति पठन्ति। व्याख्यानयन्ति च मत्स्यऽव भेटुनिमत्स्यः, तस्य लौहमयतालकाकारं मुखं भवति अतस्तन्मुखार्द्धाकारं यन्त्रमेकतालकं, सर्व्वमुखाकारं द्वितालकं, तालकोऽत्रअपवारकादिपाटसन्धिवन्धनं लौहमयमुच्यते।

Dallana's Commentary, I. vii.

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For removing substances that have fallen into the meatus auditorius, Paul says:[1] "They must therefore be extracted by an earpick, a hook, or tweezers, or by using powerful shaking of the head, while the ear is placed upon some circular board." Albucasis recommends us to use a slender forceps, which resembles the modern dissecting forceps. He also commends for the purpose a hook slightly bent, which is also mentioned by Celsus.[2]

IV. The Nāḍī Yantra or Tubular Instruments.

The Nāḍī or tubular instruments are described to be of various kinds and to serve many purposes[3]. They are open either at one or both ends. These are used for the extraction of foreign substances from the natural outlets of the body. They are also recommended to be used as a diagonostic apparatus for inspection of diseases in the canals. They are the means of sucking out fluid discharges, as pus *etc.*, from cavities and they facilitate the performances of other operations. They vary in length and diameter in proportion to the different sizes of the outer canals of the body, or according to the varieties of purposes to be served by them.

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[1] Paulus Ægineta, Vol. II. VI. xxiv. (Syd. Soc. Ed.)

[2] Celsus, VI.

[3] नाड़ी यन्त्राण्यनेकप्रकाराण्यनेक प्रयोजनान्येकतोमुखान्युभयतोमुखानि च तानि स्रोतोगतशल्योद्धारणार्थं रोगदर्शनार्थमाचूषणार्थं क्रियासौकार्थार्थाश्चेति तानि स्रोतोद्वारपरिणाहानि यथायोग परिणाहदीर्घाणि च।

Suśruta Saṁhitā, I. vii.

नाड़ीयन्त्राणि शुषिराण्येकानेक मुखानि तु।
स्रोतोगतानां शल्यानामामयानाञ्च दर्शने।
क्रियाणां सुकरत्वाय कुर्य्यादाचूषणाय च।
तद्विस्तार परिणाह दैर्घ्यं स्रोतोऽनुरोधतः॥ ९॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

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The tubular instruments are used for fistula-in-ano, haemorrhoids, tumours, abscesses, injections into the rectum, vagina and urethra, hydrocele, ascites, inhalations, stricture of urethra and rectum and cupping as by gourd and horns.[1]

As examples of the tubular instruments, Vāgbhaṭa II. mentions:—

1. KAṆṬHASALYĀVALOKINĪ[2] OR THROAT SPECULUM.

To examine foreign substances such as a fish-bone in the throat, the instrument should have a length of ten aṅguli and a circumference of five aṅguli.

Suśruta describes the extraction of a foreign body, made of lac from the throat of a patient by the following device. A heated iron probe or sound should be introduced into the throat of a patient through a tube of copper and made to touch the bit of shellac. The foreign substance would begin to dissolve or soften and so will adhere to the probe. The rod is then to be cooled by sprinkling water through the tube and the foreign body then should be drawn out steadily with it.[3] But other kinds of foreign bodies are to be extracted from the throat by means of a rod-like instrument, one end of which is smeared with melted wax or shellac.

The use of some adhesive substance for extraction of foreign bodies accidentally introduced into the outer passages of the

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[1] भगन्दरार्शोऽर्व्बुदव्रणवस्त्यश्मरीवस्तिमूत्रसङ्गिदकोदरधूमनिरूहप्रकाशसन्निरूहगुदयन्त्राण्य-लाबूष्ट्रयन्त्राणि चोपरिष्टाद्व्याख्यास्यामः।

Suśruta Saṁhitā, I. vii.

[2] दशाङ्गुलाईनाहान्त. कण्ठशल्यावलोकिनी।

Aṣṭāṅga Hṛdaya, I. xxv.

[3] जातुषे कण्ठासक्ते कण्ठे नाड़ीं प्रवेश्याग्नितप्ताञ्च शलाकां तथावगृह्य शीताभिरद्भिः परिषिच्य स्थिरीभूतमुद्धरेत्। अजातुषं जतुमधूच्छिष्टलिप्तया शलाकया पूर्व्वकल्पेनेत्येके।

Suśruta Saṁhitā, I. xxvii.

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human body was well known to the Greeks and Romans. Paul says:[1] "Stones and such like bodies we extract by wrapping wool round an earpick, and smearing it with turpentine-rosin, or some glutinous substance, and introducing it gently into the meatus auditorius."

2. Pañcamukha and Trimukha.

To take a good hold of a four-eared arrow, a speculum having five holes (Pañcamukha) should be had recourse to; and for a two-eared arrow, a speculum having three holes (Trimukha) would be necessary. The central hole is for the arrow, while the side holes are meant for the ears of the arrow.[2]

Celsus[3] says that when a weapon buried in the flesh has barbs too strong to be broken with forceps, they may be shielded with split writing-reeds (Calamus scriptorium), and the weapon thus withdrawn.

Paul says: "Some apply a tube round about the barbs[4] so that when they draw out the weapon, the flesh may not be torn by the barbs."

In modern times a snare is used instead of a tube. Dr. Erichsen[5] writes: "The extraction of an arrow is usually attended with little difficulty. But if barbed, special precautions have to be taken. With the view of safely effecting its removal, the snares.....have been devised."

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[1] Paulus Ægineta. Vol. II. VI. xxiv. (Syd. Soc. Ed.)

[2] नाड़ीपञ्चमुखच्छिद्रा चतुष्कर्णस्य संग्रहे।
वारङ्गस्य द्विकर्णस्य त्रिच्छिद्रा तत् प्रमाणतः।

Aṣṭāṅga Hṛdaya, I. xxv.

[3] Celsus. vii. v.

[4] The Works of Paulus Ægineta. vi. lxxxvii.

[5] The Science and Art of Surgery. Vol. I. pp. 343.

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3. TUBULAR INSTRUMENTS FOR INSPECTION OF ARROWS.

Again for the inspection of the arrows, various kinds of tubular instruments would be necessary, which will vary according to the shape, length, and circumference of the arrows and their ears.[1]

4. ŚALYANIRGHĀTANĪ.

The top of this tubular instrument is shaped like the disc of a lotus and is closed. The other end is open and leads to a hollow extending to a fourth part of the tube. It has a length of twelve aṅguli. It is useful for removing an arrow fixed deeply into the body, in different directions and thus helping its easy extraction.[2] For this purpose Suśruta directs us to use a stone hammer.

The Śalyanirghātanī had its counterpart in the female part of the Impellent, mentioned by Paul, for forcing an arrowhead forwards through a part so as to extract it at the side opposite to that of its entrance. It would thus be seen that the function of the Impellent was similar to that of the Śalyanirghātanī; the former moved it forwards, while the latter moved the śalya side to side, the object of both being to extract the foreign substance. The Impellent would seem to have been a plain rod of metal pointed at one end (the male part) and hollowed at the other (the female part); the pointed end used to be introduced into the socket of an arrow when it possessed one, and the hollow

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[1] वारङ्गं कर्णसंस्थानं नाहं दैर्घ्यानुरीधतः।
नाड़ीरेवं विधाश्चान्या द्रष्टुं शल्यानि कारयेत् ॥ १० ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[2] पद्मकर्णिकया मूर्ध्नि सदृशी द्वादशाङ्गुला।
चतुर्थ शुषिरानाड़ी शल्यनिर्घातनी मता ॥
Ibid.

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end was meant to fit over the tail in case where the arrow was tanged.[1] The Greeks and Romans recognised the necessity of an arrow being moved about until loosened, if it remained fixed in the bone; and Celsus[2] directs us to strike it with some iron instrument until it be shaken from the place where it is lodged.

5. Tubular instruments for piles.

According to Suśruta[3] these should be made either of iron, or ivory, or horn or wood. They are hollow instruments tapering at the end which should be shaped like the teat of a cow. For males, the length is four aṅguli, while the circumference is five aṅguli. In the case of females, however, the tube should be made wider, the circumference being six aṅguli, and longer, the length being equal to the space covered by the palm of the hand. There are two slits on the sides—one for inspection of diseases and the other to allow application of caustic and cautery to the diseased part. The slit measures three aṅguli in length and the pulp of the thumb in breadth. At a distance of a half aṅguli from the margin of the slit, is raised a circular projection, also a half aṅguli high.

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[1] Paulus Ægineta, VI. lxxxviii.

[2] Celsus, VII. 5.

[3] तच्च यन्त्रं लौहं दान्तं शार्ङ्गं वार्द्धं वा गोस्तनाकारं चतुराङ्गुलायतं पञ्चाङ्गुलपरिणाहं पुंसां षड़ङ्गुलपरिणाहं नारीणां तलायतं तदूर्द्धच्छिद्रं दर्शनार्थमेकं छिद्रमेकं छिद्रन्तु कर्म्मणि। एकद्वारे हि शस्त्रचाराग्नीनामतिक्रमो न भवति। छिद्रप्रमाणन्तु व्याङ्गुलायतमङ्गुष्ठोदरपरिणाहं यदङ्गुलमवशिष्टं तस्यार्द्धाङ्गुलमधस्तादर्द्धाङ्गुलोच्छ्रितोपरिवृत्तकर्णिकमेषयन्वाकृतिसमासः।

Suśruta Saṁhitā, IV. vi.

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Vāgbhaṭa[1] describes two different instruments, one for inspection and the other for medication. They both have the same length and circumference. The former has two slits on the side, while the latter has only one slit, three aṅguli long and the pulp of the thumb in width. The annular projection is turned upwards : the object being the prevention of sudden introduction of the instrument too far inwards.

A similar instrument without any slit on the side is called Śamī[2]. It is advised to be used for exerting pressure over the piles by its introduction into the rectum (Vāgbhaṭa.)

Rectal speculum is mentioned by Hippocrates in his treatise on fistula[3] and by Paul in the treatment of piles.[4] It is called Calopter in contradistinction to the vaginal speculum which is called Diopter. The rectal speculum in the Naples museum is a two bladed instrument working with a hinge in the middle. In modern times, both the varieties of the speculum, tubular and valved, are in use.

For inspection and medication of piles, a tubular speculum is recommended to be used by the veterinary surgeons. In the

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[1] अर्शसां गोस्तनाकारं यन्त्रकं चतुरङ्गुलम् ।
नाहे पञ्चाङ्गुलम् पुंसां प्रमदानां षड़ङ्गुलं ।
द्विच्छिद्रं दर्शने व्याधेरेकच्छिद्रन्तु कर्म्मणि ।
मध्येऽस्य त्र्यङ्गुलच्छिद्रमङ्गुष्ठोदर विस्तृतम् ।
अर्द्धाङ्गुलोच्छ्रितोद्वृत्त कर्णिकञ्च तदूर्द्ध्वतः ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] शम्याख्यां तादृग्च्छिद्रं यन्त्रमर्शः प्रपीड़नं ॥ १३ ॥

Ibid.

[3] The Genuine Works of Hippocrates. (Syd. Soc. Ed.) Vol. II. P. 817.

[4] Paulus Ægineta, VI. lxxix.

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Aśvavaidyaka, Jayadatta sūri[1] describes the instrument thus: "The surgeon should know the instrument to have the length of six aṅguli. On the two sides, the wise surgeon should make two slits, three aṅguli long and a half aṅguli broad. Through an instrument with two slits, the piles of the horses should be examined. Through a speculum with one slit, the surgical operations, such as incisions &c., should be performed, after having tied the horse and making him lie down".

6. Tubular Instruments for Fistula-in-ano.

These are similar to the instruments used for the inspection and medication of piles, the only difference being the omission of the circular rings in their construction, for otherwise, the projection may rub over the sore if the speculum be introduced deeply.[2]

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[1] यन्त्रं षड़ङ्गुलं विद्यान् च्छिद्रं पञ्चाङ्गुलं भिषक्।
अधोऽर्द्धाङ्गुलाविस्तीर्णं दैर्घ्येणाप्यङ्गुलत्रयम्॥
उभयोः पार्श्वयोस्तस्य कुर्य्याच्छिद्रद्वयं बुधः।
अर्शस्तेन तु वाहस्य द्विच्छिद्रेण विलोकयेत्॥
एकच्छिद्रेण वै कर्म्म कुर्य्याच्छेदादि पूर्व्वकम्।
पातितस्य सुबद्धस्य तुरङ्गस्य विचक्षणः॥

Aśvavaidyaka (Bibliotheca Indica). Liii. vs. 4, 5 and 6.

[2] छिद्रादूर्द्धं हरेदीषदमर्शयन्त्रस्य यन्त्रवित्।
ततो भगन्दरे दद्यादेतदर्द्धेन्दु सन्निभं॥

Suśruta Saṁhitā, IV. viii.

सर्व्वथाऽपनयेदीषत् छिद्रादूर्द्धं भगन्दरे।

Aṣṭāṅga Hṛdaya, I. xxv.

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7. Tubular Instruments for the Nose.

Nasal-Speculum.

Similar tubular instrument without ring is to be used for examination of nasal diseases as tumours and polypus. It is however shorter and thinner than the rectal speculum. Vāgbhaṭa says: "It is two aṅguli long and admits the index finger in its lumen. The tube has a single slit on the side."[1]

He describes nasal tubes for introducing medicated powders into the nose as snuff.[2] After partially filling the tube with powders, one should blow through the empty end, the other end being put well inside the nasal cavity. Suśruta also uses a tube to blow powder into the nose.[3] Caraka[4] mentions nasal insufflation to cure diseases. Śārṅgadhara[5] and Cakradatta[6] describe the nasal tube for insufflation to be six aṅguli long and open at both ends.

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1 घ्राणार्ब्बूदार्शसामेकच्छिद्रा नाड्यङ्गुलद्वया।
प्रदेशिनी परिणाहा स्याद्गगन्दर यन्त्रवत् ॥ १५ ॥
Aṣṭāṅga Hṛdaya, I. xxv.

2 ध्मानं विरेचनचूर्णं युञ्जात् तं मुखवायुना।
षड़ङ्गुलद्विमुखया नाड्या भेषजगर्भया।
Ibid. I. xx.

3 नासास्रावे घ्राणतचूर्णमुक्तं नाड्यादेयं यीऽवपीड़श्चतीक्ष्णः।
Suśruta Saṁhitā, VI. xxiii.

4 सिद्धिं स्याद्नावनं चूर्णैस्तैषां प्रधमणे हितं।
Caraka Saṁhitā, VI. xxvi.

5 षड़ङ्गुला द्विवक्त्रा या नाड़ी चूर्णान्वयो धमेत्।
तीक्ष्णं कीलसितम्वक्त्र वातः प्रधमनं हितं ॥
Śārṅgadhara Saṁgraha, III viii.

6 ध्मापनं रेचनचूर्णं युञ्जात् तत् मुखवायुना।
षड़ङ्गुल द्विमुखया नाड्या भेषजगर्भया ॥
Cakradatta, Nasyādhikāra.

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Aretaeus says that a quill or reed or a wide long tube may be used for blowing powders into the pharynx. Alexander Trallianus[2] says that a calamus scriptorium, the joints of which have been removed, may be used as an insufflator. Oribasius[3] however gives the fullest description of the tube used as a nasal insufflator. "A reed slender and with a straight bore, 6 inches in length, and of such a size that it can be passed in the nares, is taken and its cavity entirely filled with medicament. The reed may be either natural or of bronze. This being placed in the nares, we propel the medicament by blowing into the other end."

In modern times, we advise our patients to do the same thing when powders are prescribed to be thrown into the nose or ears. The cylindrical shaft of the ordinary quill so cut as to be open at both ends will serve the purpose admirably. The nasal insufflator is used now for identical object.

Aretaeus[4] mentions a nasal syringe with a double tube. It consists of two pipes united together by an outlet so that liquid medicine may be injected into both the nasal cavities simultaneously, for injection into each nostril separately, he points out, can not be borne.

It is remarkable that in Mahāvāgga[5] mention is made of single and double nose-spoons. Nāthu-karaṇi (*i.e.*, an instrument to hold up the nose, so that the medicated oil

[1] Aretaeus, Vol. II., P. 408.

[2] Alexander Trallianus, IV. viii.

[3] Oribasius Collect, xii.

[4] Aretaeus, Ed. Adams, Vol. II., P. 459.

[5] Mahāvāgga, VI. 13. 1 & 2. Sacred Books of the East.

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does not run out...Ed.) and Yamaka-nāthu-karaṇi (*i.e.*, one that would go up both nostrils...Ed.). They are recommended to be made of gold, or silver, or bone, or ivory, or horn, or of the *nala* reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of chank-shell". (Sacred Books of the East).

To apply oily medicines inside the nasal cavity a cotton wick is first soaked in the oil and then it is pushed well inside the nose. It is recommended also to pour oil into the cavity through a tube, while the other cavity is pressed by a finger (Vāgbhaṭa[1]).

To treat a case of fracture of the nasal bones, Suśruta recommends[2] two straight tubes open at both ends to be introduced into the nasal cavities, after putting the fractured ends in position, either lowering or elevating the raised or depressed end by a rod as required. Then bandages are to be applied. The tubes serve as splints to support the broken ends in position, while through their orifices the patient may breathe without inconvenience.

Similarly Celsus, after replacing the fractured ends in position uses oblong tents sewed round with a thin soft skin as splints into the nostrils; or a large quill smeared with gum, or artificer's glue may be applied in the same way. Paul also

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[1] नासापुटं पिधायैकं पर्य्यायेण निषेचयेत्।
उष्णास्तु भेषज्यं प्रनाड्या पिचुनाऽथवा॥

Aṣṭāṅga Hṛdaya, I. xx.

[2] नासां सन्नां विडग्नां वा ऋज्वीं कृत्वा शलाकया।
पृथग् नासिकयोर्नाड्यौ द्विमुखौ संप्रवेशयेत्॥
ततः पट्टेन संवेष्ट्य घृतसेकं प्रदापयेत्॥

Suśruta Saṁhitā, VI. iii.

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says: "And some sew the quills of the feathers of a goose into the rags, and thus introduce them into the nose, in order that they may preserve the parts in position without obstructing the respiration; but this is unnecessary as respiration is carried on by the mouth."[1]

Suśruta also advises us to introduce these tubes into the nasal cavities during the performance of the Rhinoplastic operations.[2]

8. The Aṅguli-trāṇaka or Finger-guard.

Vāgbhaṭa says:[3] "It is generally made either of ivory or wood. The instrument is shaped like the teat of a cow, and is four aṅguli long. Two slits occur on the sides like those in the speculum for piles."

It protects the finger of the surgeon from being injured by the teeth of the patient and so helps the surgeon in opening the mouth of the patient with ease.[4]

In modern times, finger-guards are used for the same purposes.

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[1] Paulus Ægineta, Vol. II. vi, xci. Syd. Soc. Ed.

[2] सुसंहितं सम्यगथो यथावन्नाड़ीद्वयेनाभिसमीक्ष्य वङ्क्षा।
प्रोन्नम्य चेनामवचूर्णयेच्च पत्तङ्गयष्टीमधुकाञ्जनैश्च ॥
Suśruta Saṁhitā, I. xvi.

[3] अङ्गुलित्राणकं दान्तं वार्क्षं वा चतुरङ्गुलम्।
द्विच्छिद्रं गोस्तनाकारं तद्वक्त्रविवृतौमुखं ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[4] तच्च वक्त्र विवृतौ, सम्वृत मुखस्यातुरस्य मुखव्यादान निमित्तं सुखं सुखकरं स्यात्। यत इदं दन्तघातात् रक्षति अत उक्तं सुखमिति।
Vāgbhaṭārtha Kaumudi, I. xxv.

अङ्गुलिर्दन्तेभ्यो रक्षणार्थत्वादङ्गुलित्राणमिति नाम।
Sarvāṅga Sundarī, I. xxv.

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9. JONI-VRAṆEKṢAṆA OR VAGINAL SPECULUM.

Vāgbhaṭa[1] describes it to be a tubular instrument, sixteen aṅguli long, and six aṅguli in circumference. It consists of four blades, attached at their bases to a ring. The tube tapers gradually, the end is free and looks like the bud of a lotus. To the four blades are soldered four rods in such a way that on pressing their free ends, which pass out of the ring, by the surgeon's hands, the tapering end of the tube would gape widely. The surgeon by regulating the pressure of his hand, may open or close the speculum to any desired extent.

Another kind of vaginal speculum used to be manufactured out of the two horns of a buffalo by dividing each into two longitudinal halves. They should be so paired that their concave surfaces would look towards one another, their ends diverging outwards. So we get a pair of bivalve speculum out of a pair of horns.

The bivalve speculum of horn mentioned above, has its modern counterpart in the pair of speculum known as Barne's or Neugebauer's speculum.

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[1] योनिव्रणेक्षणं मध्ये शुषिरं षोड़शाङ्गुलम्।
मुद्रावद्धं चतुर्भिस्तमम्भोज मुकुलाननं।
चतुःशलाकमाक्रान्तं मूले तद्विकसेन्मुखे ॥ १७।

Aṣṭāṅga Hṛdaya, I. xxv.

अस्य यन्त्रस्य कल्पनायां चत्वारिखण्डानि तथा कार्य्याणि यथा मुद्रिकया वद्धानि मिलितानि च पद्ममुकुलाकार मुखा, अन्तर शुषिरा षड़ङ्गुल परिणाहवती नाड़ी स्यात्। ततस्तन्मध्ये प्रत्येकं खण्डसंलग्नं चतस्रः शलाकाः आमुखात् सन्निवेश्य शलाकानामध्यभागे तथा बध्नीयात् यथा शलाकामूल पीड़नेन यन्त्रस्य मुखं विकसेत।

Vāgbhaṭārtha Kaumudī, I. xxv.

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The vaginal speculum or Diopter is mentioned by Soranus, Paul[1] and other Greek surgeons. Paul describes its method of working as follows:— "The person using the speculum should measure with a probe the depth of the woman's vagina, lest the stalk (fistula) of the speculum being too long, it should happen that the uterus should be pressed upon. If it be ascertained that the stalk is larger than the vagina, folded compresses are to be laid on the alæ pudendi, in order that the speculum may be placed upon them. The stalk is to be introduced, having a screw at the upper part, and the speculum is to be held by the operator, but the screw is to be turned by the assistant, so that the laminæ of the stalk being separated, the vagina may be distended." The accounts given by Albucasis[2] and Haly Abbas[3] are similar. These instruments are described to be bivalve, trivalve or quadrivalve. A quadrivalve speculum of the Greeks is identical with the Joni-vraṇekṣaṇa of the Hindus; the only difference being that the former is acted by screw mechanism, while the latter is worked on the principle of the lever. Drawings of several shorts of the Greek instruments are given in the surgery of Albucasis and by Schultet.[4] There are three specimens of vaginal speculum in the Naples museum, drawings of which are given by Milne. In modern times, we use similar valvular speculum for identical purposes.

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[1] Paulus Ægineta, Vol. II. vi. lxxiii. Syd. Soc. Ed.

[2] Albucasis, Chirrug, II. 71.

[3] Haly Abbas, Pract. ix. 57.

[4] Arsenal de chirrug. tab. 18.

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10. Tubular Instruments for wounds.

Vraṇa-vasti or Wound-syringe.

If the wound be caused by deranged air and be very tender, especially if it forms on the lower half of the body, the vasti should be used. In diseases of the urinary organs, such as, obstruction of urine, faulty conditions of urine, impure semen, stone in the bladder and disorders of menstruation, uttara-vasti is necessary.[1]

There are two instruments mentioned—one for application of oleaginous medicines to a sore and the other for washing a sinus with medicated lotions. Each consists of a tube and a leather bag. The tube is smooth and rounded and is shaped like a cow's tail.[2] It is six aṅguli long. The base is broad and admits a thumb, while the end is narrow and admits a pea. There is a circular projection or ring at a short distance from the end. The base is fitted tightly into a bag of thin leather.[3]

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[1] वातदुष्टो व्रणोयस्तु रूक्षाग्न्यत्यर्थवेदनः।
अधःकाये विशेषेण तत्र वस्तिर्विधीयते।
मूत्राघाते मूत्रदोषे शुक्रदोषेऽश्मरीव्रणे।
तथैवार्त्तवदोषे च वस्तिरुत्तरो हितः॥

Suśruta Saṁhitā. IV. i.

[2] नाड़ी व्रणानां स्नेहप्रयोगार्थं प्रचालनार्थञ्च ते यन्त्रे आह यन्त्रे इत्यादि नाड़ीव्रणाभ्यङ्ग चालनाय नाड़ीव्रणानामभ्यङ्गार्थं प्रचालनार्थञ्च षड़ङ्गुले षड़ङ्गुल दीर्घे, वस्तियन्त्राकृति वस्तिनेत्राकारे वृत्ते गोपुच्छाकारे * * * *

Vāgbhaṭārtha Kaumudī, I. xxv.

[3] यन्त्रे नाड़ी व्रणाभ्यङ्ग चालनाय षड़ङ्गुले।
वस्तियन्त्राकृती मूलेऽङ्गुष्ठ कलायखे।
अग्रतः कर्णिके मूले निवद्धमृदुचर्म्मणी॥ १८।

Āyurvedīya Prakāśa Saṁhitā, I. xxv

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To prevent the tube slipping out of the bag, an additional precaution is taken by tying a knot of thread over the leather covering the tube. For description of the bag, *vide infra.*

Śārṅgadhara[1] however says that the tube should have the thickness of the shaft of a vulture's feather and should admit a moong (Phaseelus Moong). It is eight aṅguli long.

Pālakāpya describes the tube for washing wounds of elephants to be made of copper, and shaped like the karontaka flower. It is sixteen aṅguli long.

In modern times, wound syringes are similarly used to wash the sore with medicated lotions.

For description of the tubes for vraṇa-dhupana or wound-fumigation, *vide infra.*

11. Tubular Instruments for Ascites.

Dākodara yantra or Canula.

It may be either metallic or manufactured from the cylindrical hollow calamus of a peacock's feather.[2] The tube is open at both ends and is of the same calibre throughout. Suśruta advises us to use a pipe of tin, or lead or a feather to drain the fluid, after the abdomen has been tapped.[3]

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[1] व्रणवस्तिस्तु नेत्रं स्यात् श्लक्ष्णमष्टाङ्गुलोच्छ्रितम्।
सुच्छिद्रमग्र्यपत्रपचनलिकापरिणाहि च।

Śārṅgadhara Saṁgraha, III. vi.

[2] द्विदारा नलिका पिच्छनलिका वा दाकोदरे। १९।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[3] तत्र वङ्गादीनामन्यतमस्य नाड़ीद्विदारां पचनाड़ीं वा संयोज्या दोषोदकमवसिञ्चेत्ततो नाड़ीमपहृत्य तैललवणेनाभ्यज्य व्रणवस्तेनोपचरेत्।

Suśruta Saṁhitā, IV. xiv

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Celsus describes a lead or copper canula for draining ascites.[1] Paul writes that the tip used to be bevelled off like a writing pen.[2] It was also employed in empyema.[3] Albucasis[4] mentions a tube of silver or copper or brass having a small hole at the bottom and three on its sides.

In modern times we use a metallic canula of similar shape for draining fluid in ascites.

12. Tubular Instruments for Hydrocele.

This is practically the same instrument described above. Suśruta[5] mentions a tube or canula to drain the fluid after tapping the hydrocele with the vrīhimukha śastra or trocar. The Greek surgeons did not describe the operation. They preferred the open incision to puncture.[6] Rhases, however, describes the operation of puncturing the scrotum for hydrocele.[7]

13. Tubular Instruments for Urethral Stricture.

Suśruta recommends gradual mechanical dilatation of the urethra by means of tubes made of iron, or wood, or lac, well-smeared

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[1] Celsus, vii. 15 &. ii. 10.

[2] Paulus Ægineta, Vol. II. VI. L. Syd. Soc. Ed.

[3] Hippocrates, ii. 259.

[4] Albucasis, Chirrug, ii. 54.

[5] मूत्रजां स्वेदयित्वातु वस्त्रपट्टेन वेष्टयेत् ॥
सेवन्या: पार्श्वतोऽधस्ता द्विध्येद्वीहिमुखेन च ।
अथाव द्विमुखां नाड़ीं दत्वा विस्रावयेद् भिषक् ॥

Suśruta Saṁhitā, IV. xix.

[6] Paulus Ægineta, VI. lxii.

[7] Rhases, Cont. xxiv.

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with ghee.[1] He advises us to use the same tube for three consecutive days, then another of larger calibre for three days more, and so on, till the canal be fully dilated. He reserves External Urethrotomy as a last resource.[2]

14. Tubular Instruments for Rectal Stricture.

Suśruta similarly describes gradual dilatation of stricture of the rectum, using a higher number of diliators after the lapse of three days until the desired effect is attained.[3]

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[1] (a) निरुद्धप्रकाशे नाड़ीं लौहीमुभयतोमुखीं ॥
दारवीं वा जतुकृतां घृताभ्यक्तां प्रवेशयेत् ।
परिषेक वसामज्ज शिशुमारवराहयोः ॥
चक्रतैलं तथायोज्यं वातघ्नप्रव्यसंयुतं ।
व्याहाच्याहात् स्थूलतरां सम्यङ्नाड़ीं प्रवेशयेत् ॥
स्रोतोविवर्द्धयेदेवं स्निग्धमन्नञ्च भोजयेत् ।
भित्वावा सेवनीं मुक्तां सद्यःक्षतवदाचरेत् ॥

Suśruta Saṁhitā, IV. xx.

(b) निरुद्ध प्रकाशे नाड़ीं द्विमुखीम् कनकादिजम् ।
चिक्षाभक्तां चुल्लुकादिस्नेहेन परिषेचयेत् ।
तैलेन वा वचदारुकल्कैः सिद्धेन च व्याहात् ॥
पुनः स्थूलतरा नाड़ीदेया स्रोतोविवृद्धये ।
... ...
... ... रुद्धगुदेऽप्येष क्रियाक्रमः ॥

Cakradatta, Kṣudraroga Cikitsā.
See also Yogaratnākara, P. 368, where these verses are quoted.

[2] See I (a). अस्यार्थ :—सेवनीं त्यक्त्वा शस्त्रेण वा मूत्रस्रोतः संकोचकारणं चर्म विदारयेत् । तस्यापि द्वारस्याविपाटे मणिबन्धमात्रं दारयेदिति ।

Commentary of Srī Kaṇṭha in Vyākhyā Kusumāvalī (Anandāsram Series), P. 406.

[3] सन्निरुद्ध गुदे योज्या निरुद्धप्रकाशक्रिया ॥

Suśruta Saṁhitā, IV. xx.

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There is no mention of solid bladder sounds in the Sanskrit medical books. But from the above descriptions, it seems beyond doubt that they had a set of dilators for stricture of the urethra and another set of dilators for stricture of the rectum. These dilators were tubes—either metallic or wooden—and had a regular gradation in the increse of their diameters. Cakrapāṇī mentions stricture dilators of gold.[1]

In modern times we have also two sets of these instruments —urethral and rectal dilators, numbered in an ascending series according to the increased diameters of these instruments.

15. Tubular Instruments for Injections into the Rectum.

Vasti yantra or Rectal Clyster.

Injections into the rectum are to be thrown by means of a tube with a membranous bag tied to its end. The tube is advised to be made either of gold, or silver, or lead, or copper, or brass, or bell-metal, or ivory, or horns, or glass, or precious stones, or wood or bamboo. It should be clean, smooth, strong, and tapering like a cow's tail, and should terminate in a smooth rounded bulb. The tube varies in length and circumference according to the age of the patient as follows:—

I. Caraka.[2]

Age.	Length of tube.	Opening at the end admits.
6 years ...	6 anguli ...	A moong
12 „ ...	8 „ ...	A pea
20 „ and over ...	12 „ ...	A small plum seed

[1] See foot note I (b), Page 124.

[2] सुवर्णरूप्यत्रपुतास्त्रीति
कांस्यायसास्थिद्रुमवेणुदन्तैः।
नलैर्विषाणैर्मणिभिश्च तैस्तैः
कार्य्याणि नेत्राणि सुकर्णिकानि॥

II. Suśruta.[1]

Age.	Length of tube.	Part of tube in bag.	Circumference of tube.	Circumference at end.	Measure of injection.
1 year	6 aṅguli	1½ anguli	Little finger	Shaft of heron's feather.	2 añjali
8 „	8 „	2 „	4th „	Shaft of falcon's feather.	4 „
16 „	16 „	3½ „	3rd „	Shaft of peacock's feather.	8 „
50 „	12 „	3 „	Pulp of thumb	Admits a plum stone.	12 „
70 „	Same as that of the 16th year.				

षड्द्वादशाष्टाङ्गुल सम्मितानि षड्विंशतिद्वादशवर्षजानाम् ।
स्युर्मुद्गकर्कन्धु सतीनवाहिच्छिद्राणि वर्त्त्यापिहितानि चापि ॥
यथावयोऽङ्गुष्ठ कनिष्ठकाभ्यां मूलाग्रयोः स्युः परिणाहवन्ति ।
ऋजुनि गोपुच्छसमाकृतीनि:श्लक्ष्णानि च स्युर्गुड़िकामुखानि ॥
स्यात् कर्णिकैकाग्र चतुर्थभागे मूलाश्रिते वस्ति निवन्धने द्वे ।
जारद्गवोमाहिषहारिणो वा स्याच्छौकरो वस्तिरजस्य वापि ॥
दृढ़स्तनुर्नष्टशिरो विगन्धः कषायरक्तः सुमृदुः सुशुद्धः ।
नृणां वयोवीक्ष्य यथानुरूपं नेत्रेषु योज्यस्तु सुवद्धसूत्रः ॥

Caraka Saṁhitā, VIII. iii.

Also quoted in Cakradatta, Anuvaṣanādhikāra.

[1] तत्र सांवत्सरिकाष्टद्विरष्ट वर्षाणां षड़ष्टदशाङ्गुल प्रमाणानि कनिष्ठिकानामिका मध्यमाङ्गुलि परिणाहान्यग्रेऽध्यर्द्धाङ्गुलार्द्ध तृतीयाङ्गुल सन्निविष्ट कर्णिकानि कङ्कश्येन वर्हिपत्र नाड़ीतुल्य प्रवेशानि मुद्गमाषकलायमात्र स्रोतांसि विदध्यान्नेत्राणि तेषु त्वास्थापनाद्रव्य प्रमाणमातुर हस्तसम्मितेन प्रसृतेन सम्मितौ प्रसृतौ द्वौचत्वारोऽष्टौ विधेयाः ।

भवति चात्र ।

वर्षोत्तरेषु नेत्राणां वस्तिमानस्य चैव हि ।
वयोवलशरीराणि समीक्ष्य वर्द्धयेद्विधिं ॥

पञ्चविंशतेरूर्द्ध द्वादशाङ्गुलं मूले ङ्गुष्टोदर परिणाहमग्रे कनिष्ठिकोदर परिणाहमग्रे त्र्यङ्गुलसन्निविष्ट कर्णिकं गृध्रपत्रनाड़ीतुल्य प्रवेशं कोलास्थिमात्रं च्छिद्रं क्लिन्नकलायमात्रं छिद्रमित्येके । सर्व्वानिमूले वस्तिनिवन्धनार्थं द्विकर्णिकानि । आस्थापन द्रव्य प्रमाणं तु विहिता द्वादश प्रसृताः । सप्ततेस्तूर्द्ध नेत्र प्रमाणमेतदेवद्रव्य प्रमाणन्तु द्विरष्टवर्षवत् ।

तत्र नेत्राणि सुवर्णरजतताम्रयोरीति दन्तशृङ्गमणितरुसारमयानि श्लक्ष्णानि दृढ़ानि गोपुच्छाकृतीन्यृजुनि गुटिका मुखानि । वस्तयाश्चाद्वद्धानां मृदवो नाति वह्ला दृढ़ाः प्रमाणवन्तो गोमहिषवराहाजोरभ्राणां ।

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III. Vāgbhaṭa II.[1]

Age. (years).	Length of tube.	Opening at base admits.	Opening at end admits.
Under 1	5 aṅguli	1 finger	A moong (phaseolus moong).
1 to 6	6 „	1½ „	A masha (phaseolous Rox).
7 to 11	8 „	2 „	A kalāya (pea) (pinus sativum).
12 to 15	9 „	2½ „	Boiled pea.
16 to 20	12 „	3 „	A śṛgalakoli (zizyphis cenoplia).
over 20	varies according to the age, strength and size of the patient; but the orifice at the base of the tube need not be wider.		

नेवलाभे हितनाड़ी नलवंशास्थि सम्भवा।
वस्त्रलाभे हितं चर्म्म सूक्ष्मं वा तान्तवं घनम्॥
वस्तिं निरूपदिग्धन्तु गुदं सुपरिमार्जितं।
मृदनुद्धत हीनच मुहःस्नेहविमर्दितं।
नेवमूले प्रतिष्ठाप्य न्युब्जन्तु विवृताननम्॥

Suśruta Saṁhitā, IV. xxxv.

[1] तयोस्तु नेवं हैमादि धातु दार्व्वऽस्थि वेनुजं।
गोपुच्छाकारमच्छिद्रं श्लक्ष्णजुं गुड़िका मुखं॥
ऊनेऽब्दे पञ्चपूर्णेऽस्मिन्नासप्तभ्योऽङ्गुलानि षट्।
सप्तमे सप्त तान्यष्टौ द्वादशे षोड़शे नव।
द्वादशैव परं विंशाद् वीक्ष्य वर्षान्तरेषु च।
वयो बल शरीराणि प्रमाणमभिवर्द्धयेत्॥
साङ्गुष्टेन समंमूले स्थौल्येनाग्रे कनिष्ठया॥
पूर्णेऽब्दे ऽङ्गुल मादाय तदर्द्धार्द्ध प्रवर्द्धितं।
चाङ्गुलं परमं छिद्रं मूलेऽग्रे वहते तु यत्।
मुद्गं माषं कलायन्तु स्विन्नं कर्कन्धुकं क्रमात्॥
मूल च्छिद्र प्रमाणेन प्रान्ते घटित कर्णिकं।
वर्त्मार्थ पिहितं मूले यथास्वं द्वाङ्गुलान्तरं।
कर्णिका हितयं नेवे कुर्य्यात् तच्च योजयेत्॥
अजावि महिषादीनां वस्तिं सुमृदितं दृढ़ं।
कषाय रक्तं निच्छिद्र मन्थि गन्ध शिरं तनुं।
ग्रथितं साधुसूत्रेण मुखं संस्थाप्य भेषजं।
वस्त्राऽभावेऽङ्गपादं वा न्यसेद्वासोऽथवा घनं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xix.

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Cakradatta[1], Śārṅgadhara and Bhāva Miśra[2] follow Caraka as regards measurement. Kharaṇāda[3] also gives a similar description.

[1] See foot note 2, Page 125.

[2] नेत्रं कार्य्यं सुवर्णादिधातुभिस्तच्चवेणुभिः ।
नलैर्दन्तैर्विषाणाद्यैर्मणिभिर्व्वा विधीयते ॥
एकवर्षात्तु षड्वर्षं यावन्मानं षडङ्गुलम् ।
ततो द्वादशकं यावन्मानं स्याद्दृष्टसंमितम् ॥
ततः परं द्वादशभिरङ्गुलैर्नेत्रदीर्घता ।
मुद्राच्छिद्रं कलायाभं छिद्रं कोलास्थिसन्निभम् ॥
गोपुच्छसन्निभं मूले स्थूलं तस्मात् क्रमात् कृशं ।
यथासंख्यं भवेन्नेत्रं श्लक्ष्णं गोपुच्छसन्निभम् ॥
आतुराङ्गुष्ठमानेन मूले स्थूलं विधीयते ।
कनीष्ठिकापरीणाहमग्रे च गुटिका मुखे ॥
तन्मूले कर्णिके द्वे च कार्य्ये भागाच्चतुर्थकात् ।
योजयेत् तत्र वस्तिञ्च वन्धदृढविधानतः ॥
मृगाजशूकरगवां महिषस्यापि वा भवेत् ।
मूत्रकोशस्य वस्तिस्तु तदलाभे च चर्म्मणः ॥
कषायरक्तः सुश्लक्ष्णवस्तिः स्निग्धो दृढोहितः ।
व्रणवस्तेस्तु नेत्रं स्यात् श्लक्ष्णमष्टाङ्गुलोन्मितम् ॥
सुच्छिद्रमग्रपचनलिकापरिणाहि च ।

Śārṅgadhara Saṁgraha, III. v.
Bhāva Prakāśa, I. ii.

[3] वस्तिनेत्रसृजु शुक्लं सदृत्तङ्गुलिकासुखम् ।
भवेद्गोपुच्छसंस्थानं सुप्रवाहं विकर्णिकम् ।
या विभागप्रणयने मर्यादा कर्णिका भवेत् ।
द्वे कर्णिके चोपरिष्टाद्वस्त्याधारेऽथवान्तरे ।
साङ्गुष्ठकपरीणाहं मूलं नेत्रस्य शस्यते ।
मध्यं त्वनामिकातुल्यमग्रं तुल्यकनिष्ठिकं ।
स्वे नाङ्गुलि प्रमाणेन दैर्घ्यं स्याद् द्वादशाङ्गुलम् ।
कर्कन्धुप्रवहच्छिद्रं श्रेष्ठमन्यदथावरं ।

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Hārīta[1] advises us to use a bamboo tube four aṅguli long, which is to be introduced into the rectum up to two aṅguli.

As a general rule, Caraka writes that the broad and the narrow ends of the tube are to be equal to the patient's thumb and little finger respectively, in circumference. The orifice at the end of the tube is to be kept closed by a wick, so that no foreign body may enter the lumen of the tube to occlude it. The plug may be easily removed when the tube is required for use, and then replaced.

Towards the narrow end of the tube is a projection or ring at a distance of about two aṅguli from the extremity. The height of the projection varies with the size of the tube at the base. It acts as a bar to the further introduction of the tube inside the rectum than required. Towards the base are two similar projections, two aṅguli apart from each other. To the one near the base is firmly tied the leather bag, so that the tube may not slip away suddenly during forcible compression of the bag. The other is meant to afford a firm grasp by the surgeon, so that the tube may not move during its introduction into the rectum. These projections are to be made of thread or a piece of cloth and are to be so shaped as to resemble the end of the proboscis of an elephant.

As regards the leather bags, they are recommended to be

विंशद्दादशषड्वर्षं द्वादशाष्टषडङ्गुलम्।
कर्कन्धूक सतीनाग्रसुखं विद्रवहम्॥

Kharaṇāda quoted in Sarvāṅga Sundarī, I. xix.

[1] चतुरङ्गुलां वेणुमयीं नाड़ीं प्रतिलक्षणं कृत्वा त्वया वस्तिप्रतिकर्म्म कुर्य्यात्। * * * गुदाभ्यन्तरे द्व्याङ्गुलमात्रं नाड़ी सञ्चारयेत् सुधीः।

Hārīta Saṁhitā, V. iii.

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made of the bladder of cows, or buffaloes, or hogs, or goats, or lambs. The bladder is to be well cleaned first with lime and water, so that no unpleasant smell may be emitted by the decomposition of its muscular tissue, then dyed red with Mañjiṣṭhā (Rubia Cordifoliatum) or with Harītakī (Terminalia Chebula, Retz.) and thoroughly dried. The bags are recommended to be soft, durable, entire and capacious. If the bladders of these animals are not available, the bags are to be manufactured from a frog's skin, or the peritoneum (one-fourth part would suffice) of any beast, or a piece of leather or a piece of very thick cloth. The size of the bag varies according to the age of the patient. It is to be firmly tied over the first projection at the base of the tube.

In the Siddhisthāna Chapter XI of the Caraka Saṁhitā,[1] there is a passage showing that veterinary medicine was well-known to the ancient Hindus at a very early period. This portion was edited by Dṛḍhavala and it is impossible to decide whether the passage refers to Agniveśatantra or not. It runs as follows:— "Then the disciples asked: 'How are clysters to be made in cases of animals such as elephants, camels, cows, horses, lambs and goats?' To this, the sage Ātreya explained the clysters for

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[1] अपृच्छन्दिनं सचवस्तिमब्रवीत् विधिञ्चतस्याह पुनः प्रचोदितः।
अजाविकेसौम्य गजोष्ट्रयोर्वा गवाश्वयोर्वस्तिमुशन्तिमाहिषम्॥
अजाविकादन्तसुवस्तिमुत्तरं वदन्ति वस्तिं विपरीतरूपम्।
सुवस्तिमष्टादशशोड़शाङ्गुलं तथैवनेवच्च दशाङ्गुलं क्रमात्॥
गजोष्ट्रगोऽश्वाव्यजवस्ति सन्धौ चतुर्थभागे च सकर्णिकं वदेत्।
प्रस्थस्त्वजाव्योर्हि निरूहमात्रा गवादिषु द्विगुणो यथा बलम्।
निरूह उक्तश्च तथाऽनुवास्यं गजस्य द्विस्त्वनुवासनेऽष्टमः॥

Caraka Saṁhitā, VIII. xi.

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animals in the following manner. The leather bag of the vasti-yantra should be made of a buffalo's bladder for goats, lambs, elephants, cows, camels and horses. The vasti for these animals is known as suvasti and uttara-vasti as uttara-suvasti. The tube of the suvasti should be eighteen aṅguli long for elephants and camels, sixteen aṅguli for cows and horses, and ten aṅguli for goats and lambs. Like the vasti yantra used for men, it should have a projection at the junction (of the tube with the bladder) and another at the fourth division of the tube from the end."

In the Aśvavaidyaka[1] the tube for the horse is thus described: "The tube should be made either of wood, or metals, or horn, or bamboo, or reeds. Its length should be twelve aṅguli and circumference six aṅguli. The wise surgeon should make the tube of such a calibre as to allow a plum seed to pass through it easily. It should be straight, polished and tapering from the base. At a distance of four aṅguli from the end of the tube, a projection should be raised, while for tying the leather bag firmly to the tube, two projections ought to be constructed at the base".

Pālakāpya[2] describes the rectal clysters for elephants. He advises that these are to be made either of wood or bamboo. The end is bulbous and the surface smooth. The length

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[1] काष्टैर्धातुभिश्च शृङ्गवंशनलादिभिः ।
द्वादशाङ्गुलदीर्घन्तु परिणाहे षडङ्गुलम् ॥
कोलास्थिमात्रच्छिद्रन्तु कुर्य्यान्नेत्रं विचक्षणः ।
मूलादनुक्रमं श्लक्ष्णमसृणन्तु विशेषतः ॥
त्यक्त्वाङ्गुलानि चत्वारि कर्णिकान्तस्य कारयेत् ।
पुटकस्यप्रबन्धाय मूले द्वे चापि कर्णिके ॥

Aśvavaidyaka, XVI. vs. 2—4.

[2] Pālakāpya's Hasti-Āyurveda, Sec. IV. Ch. V.

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length of the tube varies, the most convenient being sixteen aṅguli for men and sixty-eight aṅguli for elephants. The projections at the base of the tube should be twelve aṅguli high. He describes in detail the method of introduction, position of the elephant, etc.

Dṛḍhavala advises us to reject the following eight kinds of tubes and eight kinds of bags[1] :—

I. Tubes—

1. Hrasva or too short : For the injection does not reach the proper place.
2. Dīrgha or too long : For the injection passes beyond the proper place.
3. Tanu or too thin : The injection can not pass through the tube easily and so the bag may burst.
4. Sthūla or too thick : The tube pulls the mucous membrane of the rectum and anus backwards and forwards during its entrance and exit.
5. Jīrṇa or old, weak and delicate : The tube may break inside the rectum during its introduction and so cause injury to the gut or anus.

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[1] ह्रस्वं दीर्घं तनुस्थूलं जीर्णं शिथिलबन्धनम् ।
पार्श्वच्छिद्रं तथा वक्रमष्टौ नेत्राणि वर्ज्जयेत् ॥
अप्राप्तातिगतिश्चोभकर्षणक्षणनस्रवाः ।
गुदपीड़ा गतिर्जिह्मा नेत्रां दोषा यथाक्रमम् ॥
मांसलच्छिद्रविषमस्थूलजालकवातलाः ।
छिन्नः क्लिन्नश्च तानष्टौ वस्तीन् कर्म्मसु वर्ज्जयेत् ॥
गतिर्वैषम्यविस्रत्वस्राव्यदौर्याद्यनिस्रवाः ।
फेनिलच्युतधार्थैत्वं वस्तेः स्याद् वस्तिदोषतः ॥

Caraka Saṁhitā, VIII. v.

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6. Śithilabandhana: The tubes do not fit the bags well, so during compression of the bags, the injected fluid runs out by the side of the tube.
7. Pārśvacchidra or leaky: Having slit on the side, the tube may injure the soft parts by rubbing against them.
8. Bakra or curved: The motion of the injected fluid would be curvilinear. It will strike a side of the rectum and so would not go inside the gut.

II. Bags—

1. Maṁsala or fleshy: The bag emits bad smell.
2. Chidra or leaky: The injection escapes outside.
3. Viṣama or uneven: Parts are unequally compressed and so the injection does not issue in a forcible jet.
4. Sthūla or thick: It is difficult to grasp the bag and so it can not be forcribly compressed.
5. Jālaka or having a network: The injection comes out.
6. Vātala or hollow, airy and incompressible: If air can not be expelled out, froth forms in the injection; and so air is pumped into the rectum.
7. Chinna or torn: The injection flows down.
8. Klinna or moist: The injection can not be forced out.

Suśruta mentions eleven defects of tubes and five defects of bags of the Vasti yantra.[1]

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[1] अतिस्थूलं कर्कशमवनतमणुभिन्नं सन्निकृष्ट विप्रकृष्ट कर्णिकं सूक्ष्मातिच्छिद्रमतिदीर्घमतिह्रस्वमिलेकादश नेवदोषाः। बहुलताल्पता सच्छिद्रता प्रस्तीर्णता दुर्ब्बिद्धतेति पञ्चवस्ति दोषाः।

Suśruta Saṁhitā, IV. xxxv.

ऋजुनेवं विधेयं स्यात्तव सम्यग्विजानता।
अतिस्थूले कर्कशे च नेवे चावनते तथा॥

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I. Tubes—

1. Atisthūla : Too thick.
2. Karkaśa : Rough.
3. Avanata : Curved.

} Such tubes injure the rectum and so cause pain.

4. Anu : Too thin.
5. Bhinna : Broken.
6. Sannikṛṣṭa Karṇika : Projection near?

} It becomes useless to inject fluids into the rectum.

7. Viprakṛṣṭa Karṇika : Projection distant?

} Injure the rectum which bleeds.

8. Sūkṣma : Small orifice.
9. Atihrasva : Too short.

} It becomes difficult to inject as the fluid comes out.

10. Atichidra : Large orifice.
11. Atidīrgha : Too long.

} Too much fluid passes into the rectum and so pain is complained of.

II. Bags—

1. Vahalatā : Fleshy.
2. Prastīrṇatā : Large.

} It is difficult to tie the bags over the tubes properly.

3. Sacchidratā : Perforated.
4. Durvviddhatā : Difficult to tie.

} No fluid can be forced into the rectum and so the instrument is useless.

5. Alpatā : Small. Small quantity of fluid passes into the rectum.

गुदे भवेत् चतं रुक् च साधनं पूर्व्ववत् स्मृतं।
आसन्न कर्णिके नेत्रे भिन्नेऽणौ वाप्यपार्थकः॥
अवसेको भवेद्यस्तस्मादोषान्विवर्ज्जयेत्।
प्रकृष्ट कर्णिके रक्तं गुदमर्म्म प्रपीड़नात्॥
चरत्यवापि पित्तघ्नो विधिर्वस्तिश्च पिच्छिलः।
ह्रस्वेत्वणस्रोतसि च क्लेशो वस्तिश्च पूर्व्ववत्॥
प्रत्यागच्छंस्ततः कुर्य्याद्रोगान्वस्ति विघातजान्।
दीर्घे महास्रोतसि च ज्ञेयमत्यवपीड़वत्॥
प्रस्तीर्णे वहले चापि वस्तौ दुर्व्विद्ध दोषवत्।
वस्तावल्पेऽल्पता वापि द्रव्यस्याल्पगुणा मताः॥
दुर्व्विद्धे चाणु भिन्ने च विज्ञेयः भिन्न नेत्रवत्।

Suśruta Saṁhitā, IV. xxxvi.

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16. Uttara-vasti.

Urethral, Vaginal and Uterine Tubes.

Injections into the urethra and vagina are also recommended to be thrown in by similar contrivances: the tubes being adopted in length and circumference to the length and breadth of the passages for which they are intended.

1. Tubular Instruments for the Urethra.

The tubes intended for applying medicines into the male urethra is recommended to be twelve aṅguli long. Suśruta[1] advises us to use tubes fourteen aṅguli long. It is to be made of gold and is called Puṣpanetra. Its circumference is equal to that of a stalk of flower of Jātī (Jasmimum Grandiflorum) or Mālatī (Echites Crayophyllata, Rox.), and the lumen of the tube allows a mustard seed to pass through it. It is provided with an annular projection just at the central part. Caraka[2] says that

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[1] वस्तेरुत्तरसङ्ग्रस्यविधिं वक्ष्याम्यतःपरं ॥
चतुर्दशाङ्गुलं नेत्रमातुराङ्गुल सम्मितम् ।
मालतीपुष्पवल्लाग्रं छिद्रं सर्षप निर्गमम् ॥
मेढ्रायामसमं केचिदिच्छन्ति खलु तद्विदः ।
स्नेह प्रमाणं परमं कुक्षयाव प्रकीर्त्तितः ॥
पञ्चविंशादधोमात्रां विदध्याद् बुद्धिकल्पिताम् ।
निविष्टकर्णिकं मध्ये नारीणां चतुरङ्गुलं ॥
मूत्रस्रोतः परीणाहं मुद्ग वा हि दशाङ्गुलं ।
तासामपत्यमार्गे तु निदध्याच्चतुरङ्गुलम् ॥
द्व्याङ्गुलं मूत्रमार्गेतु कन्यानान्त्वेकमङ्गुलम् ।
विद्धेयं चाङ्गुलं तासां विधिवद्दर्शते यथा ॥

Suśruta Saṁhitā, IV, xxxvii.

[2] पृथ्वनेत्रञ्च हैमं स्यात् सूक्ष्मौत्तरवस्तिकम् ।

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it has two projections while Vāgbhaṭa[1] describes three. The bag is to be made of goat's bladder. A probe is first passed into the urethra to examine its condition and then the tube is introduced up to the length of six aṅguli. The bladder which contains the injection and which is tied tightly round the tube, is then compressed to force the fluid into the urethra. The tube of course, varies in size according to the dimensions of the organs of generation.

For the female, the puṣpanetra is described to have the length of ten aṅguli. The projection is at a distance of four aṅguli from the base. The circumference of the tube varies according to the width of the urethral canal. The calibre of the tube allows a moong to pass through it.[2]

जातीपुष्पस्य वृन्तेन समं गोपुच्छसंस्थितम् ।
रौप्यं वा सर्षपच्छिद्रं द्विकर्णं द्वादशाङ्गुलम् ॥ ४९ ॥
Caraka Saṁhitā, VIII. ix.

[1] आतुराङ्गुलमानेन तन्नेत्रं द्वादशाङ्गुलं ।
वृत्तं गोपुच्छवत् मूल मध्ययोः कृत कर्णिकं ।
सिद्धार्थक प्रवेशार्थं यच्च हेमादि सम्भवं ।
कुन्दाश्मसार सुमनः पुष्पवृन्तोपमं दृढं ।
तस्य वस्तिर्दृलघुर्मावा शुक्तिर्विकल्प्य वा ॥
* * * *
नेत्रं दशाङ्गुलं सुद्वप्रवेशश्चतुरङ्गुलं ।
अपत्यमार्गे योज्यं स्याद्द्व्याङ्गुलं मूववर्त्मनि ॥
मूवकृच्छ्रविकारिषु बालाना स्त्रेकमङ्गुलम् ।
Aṣṭāṅga Hṛdaya Saṁhitā, I. xix.

[2] पुष्पनेत्र प्रमाणन्तु प्रमदानां दशाङ्गुलम् ।
मूवस्रोतः परीणाहं मूवस्रोतोऽनुवाहि च ॥
गर्भमार्गे तु नारीणां विधेयं चतुरङ्गुलम् ।
द्व्याङ्गुलं मूवमार्गे तु बालाया स्त्रेकमङ्गुलम् ॥
Caraka Saṁhitā, VIII, ix

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Catheters.

It is curious to find no description of so important an instrument as the catheter. Injections were thrown into the urethra but the tube used was always a straight one, having the length of six aṅguli; so it could not possibly have reached the bladder in the male, and nowhere has the claim been put forward for it to have done so. The tube might have served well for the females. The female catheter of the Greeks, as preserved in the Naples museum, is 0·98 mm. long and is straight throughout (Milne).

In the Atharvaveda Saṁhitā,[1] however, we find a hymn, unmistakably alluding to the use of catheter in ancient times.

Against obstruction of urine with a rod.

"This hymn is intended to be 'used in a rite for regulating the flow of urine'. The reed implies some primitive form of a fistual urinaria, the vastiyantra (one of the nāḍīyantrāni) of the late physicians—who however do not appear to have made frequent uses of it".

* * * * * *

6. What in thine entrails, thy (two) groins, what in thy bladder has flowed together—so be thy urine released, out of thee with a splash! all of it. (In the groin are two vessels located in the two sides affording access to the receptacle of urine).

7. I split up thy urinator, like the weir of a tank—so be thy urine released, out of thee, with a splash! all of it.

8. Unfastened (be) thy bladder orific, like that of a water-

[1] Book 1. 3. Whitney's translations and annotations.

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holding sea—so be thy urine released, out of thee, with a splash! all of it.

9. As the arrow flew forth, let loose from the bow,—so be thy urine released, out of thee with a splash! all of it".

2. Tubular Instruments for the Vagina.

Similarly injections were thrown into the vagina. The vaginal tube should be thicker than the urethral tube and in circumference should be equal to that of the little finger. It should be introduced into the vaginal canal up to a distance of four aṅguli, whereas into the urethra, the tube was allowed to enter up to a distance of two aṅguli only in the adults and of one aṅguli only in the girls.[1]

3. The Uterine Tubes.

The uttara-vasti comprises the urethral syringe—male and female—and the vaginal and uterine clysters. No distinct uterine tube is described in the text books. But Suśruta[2] says

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[1] द्वादशाङ्गुलकं नेत्रं मध्ये च क्रतकर्णिकम्।
मालतिपुष्पवृत्ताभच्छिद्रं सर्षपनिर्गमम्॥
* * * *
स्त्रीणां कनिष्टिकास्थूलं नेत्रं कुर्याद्दशाङ्गुलम्।
सुद्वप्रवेश्यं योज्यच्च योन्यन्तश्चतुरङ्गुलम्॥
द्व्यङ्गुलं मूत्रमार्गे च सूक्ष्मं नेत्रं नियोजयेत्।
मूत्रक्रच्छ्रविकारेषु बालानामेकमङ्गुलम्॥

Śārṅgadhara Saṁhitā, III. vii.
Bhāva Prakāśa, I. ii.

[2] उर्द्धजान्वे स्त्रियै दद्यादुत्तानायै विचक्षणः।
कल्पतरस्य कषायं दद्यात् सुस्थे पीड़ितं।
विकर्णिकेन नेत्रेन दद्याद्योनिमुखं प्रति।
गर्भाशय विशुद्धार्थं स्नेहेन द्विगुणेन तु।
अप्रत्यागच्छति भिषक् वस्तावुत्तरसंज्ञिते।

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that to apply uttara-vasti to a female, she is advised to lie supine, keeping her knees flexed and well raised. For a girl the quantity of injection is one prasṛta.

To purify the uterine cavity, apply a clyster of twice the quantity of oleaginous medicines, inside the vagina by means of a tube having three rings. If after the application, the oily medicine does not flow out, then apply a second clyster containing medicines of the group called śodhana or purifiers, into the rectum; or let the clever surgeon introduce a probe into the space of the clyster; or press under her navel deeply by his closed fist. As the object of the injection is to clean the cavity of the uterus, there can be no doubt that a uterine tube is referred to in the passage. Again the precautions recommended if the injections do not come back easily, point to a uterine tube to have been used, for injections into the vagina can not be delayed in coming out. The Hindu writers often confounded the intra-uterine and urethral injections with the vaginal clyster. Caraka[1] says: "The uttra-vasti is to be used for the females during the period of menstruation, for then the uterus, being in a condition fit for impregnation, has its mouth open and so can easily be reached by the injection." This shows that uterine medication to be the object aimed at by the clyster.

भूयो वस्तिं विदध्यातु संयुक्तं शोधनैर्गणैः।
गुदे वर्तिं निदध्याद्वा शोधनद्रव्य संभृतां।
प्रवेशाद्वा मतिमान्वस्तिद्वारमथैषणीम्।
पीड़येद्वाप्यधोनाभेर्वलीनोत्तरमुष्टिना।

Suśruta Saṁhitā, IV. xxxvii

[1] स्त्रीणाञ्चार्त्तवकाले तु प्रतिकर्म्म तदाचरेत्।
गर्भासना सुखं खेहं तदादत्ते ह्यपावृता॥
गर्भं योनिस्तदा शीघ्रं जिघ्रते ग्रहणाति मारुते॥

Caraka Saṁhitā, VIII. ix.

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The Greeks were no better, for Milne also complains: "It is dificult to separate ancient descriptions of injections into the vagina from those into the uterus, for the terms for the two parts are frequently interchangeable". Again he says: "It is probable that at other times under the heading of 'injections of the bladder', only irrigation of the urethra is meant".[1]

18. Tubular Instruments for Inhalations and Fumigations.

The tubes for smoking were made, like the vasti tubes, of various metals, or glass or wood. Caraka[2] describes it as a straight tube having three pouches. The end of the tube is equal in diameter to that of a plum seed. Śārṅgadhara[3] adds that a reed or bamboo pipe will also serve the purpose. It is described as a straight tube, the broad base of which admits the patient's thumb while the narrow end, a plum seed. Suśruta[4] describes the base

[1] Graeco-Roman Surgical Instruments, P. 107-8.

[2] चतुर्विंशतिकं नेत्रं स्वङ्गुलीभिर्विरेचने ।
द्वात्रिंशदङ्गुलं स्नेहे प्रयोगे चाईमिष्यते ॥
ऋजुत्रिकोषफलितं कोलास्थ्यग्रप्रमाणितम् ।
वस्तिनेत्र समद्रव्यं धूमनेत्रं प्रशस्यते ॥१६

Caraka Saṁhitā, I. v.

[3] धूमनाड़ी भवेत्तत्र त्रिखण्डा च त्रिपर्विका ॥१०
कनीष्ठिका परीणाहा राजमाषागमान्तरा ।
धूमनाड़ी भवेद्दीर्घा शमने रोगिणोऽङ्गुलैः ॥११
चत्वारिंशन्मितैस्तद्वद्द्वात्रिंशद्भिस्तु दीप्तये ।
तीक्ष्णे चतुर्विंशतिभिः कासघ्ने षोड़शोन्मितैः ॥१२
दशाङ्गुलिर्वामनीये तथास्यादव्रणनाड़िका ।
कलायमण्डलस्थूला कुलत्थागमरन्ध्रका ॥ १३

Śārṅgadhara Saṁhitā, III. ix.

[4] तत्र वस्तिनेत्रद्रव्यैर्धूमनेत्रद्रव्याणि व्याख्यातानि भवन्ति । धूमनेत्रस्तु कनिष्ठिका परिणाहमग्रे कलायमात्रं स्रोतोमूलेऽङ्गुष्ठपरिणाहं धूमवर्त्तिं प्रवेश स्रोतोऽङ्गुलान्यष्ट चत्वारिंशत् प्रायोगिके । द्वात्रिंशत् स्नेहने । चतुर्विंशतिर्विरेचने । षोड़शाङ्गुलं कासघ्ने वामनीये च ।

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and end of the tube to be equal in circumference to that of the thumb and little finger respectively. The orifice should allow a common pea to pass easily through the tube. Vāgbhaṭa[1] says that there are three pouches or dilatations of the tube, shaped like the half-open buds at equal distances from each other. The tube is supposed to consist of four equal parts. The first pouch is located at the end of the first part, the second and third pouches at the ends of the second and third parts respectively. Cakradatta[2] also describes it similarly.

Dṛḍhabala[3] mentions another method of inhalation. He makes a paste of the medicines prescribed and smears it on a piece of silk cloth. This is then to be rolled round like a wick. This wick is to be dipped in ghee before use, and fire lit at one end, while the patient is to smoke it through the other end.

एते अपि कोलास्थिमात्र च्छिद्रे भवतः। व्रणनेत्रमष्टाङ्गुलं व्रणधूपनार्थं कलायपरिमण्डलं कुलत्थवाहि स्रोत इति।

Suśruta Saṁhitā, IV. xl.

[1] वस्ति नेत्र समं द्रव्यं विकोषं कारयेद्भिषक्।
मूलाग्रेङ्गुष्ट कोलास्थि प्रवेशं धूमनेत्रकं।
तीक्ष्ण स्नेहन मध्येषु त्रीणि चत्वारि पञ्च च।
अङ्गुलीनां क्रमात् पातुः प्रमाणे नाष्टकानि तत् ॥६॥

Aṣṭáṅga Hṛdaya Saṁhitā, I. xxi.

[2] ऋजुचिकोषफलितं कोलास्थ्यग्रप्रमाणितम्।
वस्तिनेत्रसमद्रव्यं धूमनेत्रं प्रशस्यते।
साङ्गुष्ठाग्रयुतः पूर्णोहस्त प्राद्योगिकादिषु।
नेत्रे कासहरे त्र्यंगहीनः शेषे दशाङ्गुलः॥

Cakradatta, Dhūmapānādhikāra.

[3] प्रपुन्डरीकं मधुकं शार्ङ्गष्टां समनःशिलाम्।
सरिचं पिप्पलीं द्राक्षामेलां सुरसमञ्जरीम्॥
कृत्वा वर्त्तिं पिबेद्धूमं चौमचेलानुवर्त्तिताम्।
घृताक्तामनु च चौरं गुड़ोदकमथापिवा॥

Caraka Saṁhitā, VI. xxii,

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Both Caraka[1] and Śārṅgadhara[2] advise us to make tubes of medicines, the fumes of which are advised to be smoked in the following manner:—Powder the medicaments and make a paste; measure one karsa; take a smooth reed (Saccharum sara, Rox.) twelve aṅguli long. Apply the paste round the reed, for a length of eight aṅguli. Dry it in shade. Remove the reed, leaving a dried tube of the paste. When required for smoking, light one end of the tube with a burning wick and smoke through the other end.

Caraka[3] describes another inhaler, which consists of two earthen basins (soraba) placed upon each other, their edges being pasted with flour. The upper one is perforated at the centre for the reception of one end of the tube, the patient puts the other

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[1] पिष्ट्वा लिम्पेच्छरेषीकां तां वर्त्तिं यवसन्निभां।
अङ्गुष्ठसम्मितां कुर्य्यादष्टाङ्गुलसमां भिषक् ॥
शुष्कां निगर्भां तां वर्त्तिं धूमनेत्रार्पितां नरः।
स्नेहाक्तमग्निसंदृष्टां पिबेत् प्रायोगिकीं सुखाम् ॥ ६ ॥

Caraka Saṁhitā, I. v.

[2] अथैषिकां प्रवक्ष्यामि सुश्लक्ष्णां द्वादशाङ्गुलाम्।
धूमद्रव्यस्य कल्केन लिपेत्तामष्टाङ्गुलः स्मृतः ॥
कल्कं कर्षमितं लिप्त्वा छायायां शुष्कमेव च कारयेत्।
इषिकामपनीयाथ स्नेहाक्तां वर्त्तिमादरात् ॥
अङ्गारैर्दीपितां कृत्वा धृत्वा नेत्रस्य रन्ध्रके।
वदनेन पिबेद्धूमं वदनेनैव संत्यजेत् ॥
नासिकाभ्यां ततः पीत्वा मुखेनैव वमेत् सुधीः।

Śārṅgadhara Saṁgraha, III. ix.

[3] मधूच्छिष्टं सर्ज्जरसं घृतं मल्लकसंपुटे।
कृत्वा धूमं पिबेच्छुष्कं वालं वा स्नायु वा गवाम् ॥
श्योणाकवर्द्धमानानां नाडीं शुष्कां कुशस्य वा।

Caraka Saṁhitā, VI. xxi.

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end into his mouth for inhalation. The lower pot contains glowing charcoal of catechu (Accacia catechu. Linn.) wood, over which are put pills of necessary medicines. The tube is from eight to ten aṅguli long.[1] This inhaler is intended for phthisical subjects. It is useful for allaying cough and exciting emesis. This instrument is called *mallaka sampuṭa* or *sorāba sampuṭa* or a pair of earthen basins. In such an apparatus Caraka recommends us to put powders of cow's horn, hairs, nerves and ligaments, besides other medicines. Susruta[2], Vāgbhaṭa[3] and Cakradatta[4] also describe it. Śārṅgadhara[5] however reserves this instrument for fumigating wounds only.

The length of the pipe will vary according to the different kinds of smoking prescribed by the physician. There are five kinds of smoking narrated :—

1. Śamana, madhya, proyogika — medium.
2. Briṁhana, snehana, mṛdu — mild.

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[1] दशाङ्गुलोन्मितां नाड़ीं अथवाष्टाङ्गुलोन्मिताम् ।
शरावसंपुटच्छिद्रे कृत्वा जिह्वां विचक्षणः ॥
वैरेचनं सुखेनैव कासवान् धूममापिबेत् ।

Caraka Saṁhitā, VI. xxii.

[2] इतरयोर्व्यपेत धूमोद्गार स्थिरे समाहिते शरावे प्रक्षिप्य वर्त्तिं मूलच्छिद्रेणान्येन शरावेण पिधाय तस्मिन्छिद्रे नेवमूलं संयोज्य धूममासेवेत् ।

Suśruta Saṁhitā, IV. xl.

[3] शराव सम्पुटच्छिद्रे नाड़ी न्यस्य दशाङ्गुलां ।
अष्टाङ्गुलां वा वक्त्रेण कासवान् धूममापिबेत् ॥

Astāṅga Hṛdaya Saṁhitā I. xxi.

[4] अथवा सघृतान् शक्तून् कृत्वा मल्लिकासम्पुटे ।
नवप्रतिश्यायवतां धूमं वैद्यः प्रयोजयेत् ॥

Cakradatta, Nāsāroga Cikitsā.

[5] See foot-note 2. P. 145.

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3. Recana, śodhana, tīkṣna — strong.
4. Kāsaghna — anti-cough.
5. Vāmana — emetic.

So the length of the tube would vary thus—

	Aṅguli.
1. Caraka[1]	
In strong smoking	24
„ medium „	32
„ mild „	96
2. Suśruta.[2]	
In medium smoking	48
„ oleaginous „	32
„ brain-sedative „	24
„ anti-cough or emetic „	16
3. Vāgbhaṭa.[3]	
In strong smoking	24
„ medium „	32
„ mild „	40
4. Śārṅgadhara.[4]	
In medium smoking	40
„ mild „	32
„ strong „	24
„ anti-cough „	16
„ emetic or wound-fumigation	10

FUMIGATION.

Similarly wounds are said to be purified by suitable medicinal fumigation. In the purification of wounds by fumigation, we get a glimpse of the antiseptic method of treatment in its

[1] See foot-note 2- P. 140.
[2] See foot-note 4. P. 140.
[3] See foot-note 1. P. 141.
[4] See foot-note 3. P. 140.

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embroyonic form. Suśruta[1] recommeds the tube to be eight aṅguli long and to have the circumference of a common pea; and its orific should be of the size of a kulattha (Dolichos biflorus, Linn.). The fumes of medicated substances from the inside of any closed pot containing fire, pass out through the tube and are allowed to play on any sore to purify it. For this purpose two earthen pots—sorāba samputa—may conveniently be used as before. Śārṅgadhara[2] uses a tube ten anguli long and recommends us to use Nimba leaves (Azadirachta Indica) for wound-fumigation. As another instance of the application of the principles of antiseptic methods to practical therapeutics, we may mention the use of medicinal injections into the cavity of the uterus to rectify its morbid conditions.[3]

A similar instrument was used to fumigate the uterus and vagina in various diseases of these parts. "Fumigation", says Suśruta,[4] "is to be applied to the vagina by burning the

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[1] व्रणनेत्रमष्टाङ्गुलं व्रणधूपनार्थमकलायपरिमण्डलं कुलत्थवाहिस्रोतइति।

Suśruta Saṁhitā, IV. xl.

स चौमयवसर्पिर्भिर्धूपनाङ्गैश्चधूपयेत्।

Ibid. IV. i.

[2] दशाङ्गुलिर्वामनीये तथासाद्द व्रणनाड़िका।
कलाय मण्डलस्थूला कुलत्थागमरन्ध्रका ॥१३

* * *

शरावसम्पुटे क्षिप्ता कल्कमङ्गारदीपितम् ॥१७
छिद्रे नेत्रं निवेश्याथ व्रणन्तेनैव धूपयेत्।

* * *

व्रणे निम्बवचाद्यञ्च धूपनं सं प्रशस्यते।

Śārṅgadhara Saṅgraha, III. ix.

[3] See foot note 2, P. 1318.

[4] सर्भसङ्गे तु योनिं धूपयेत् क्वाथसर्पनिर्म्योकैश्च पिण्डीतकेनवा।

Suśruta Saṁhitā, III. x.

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slough of a snake (Bungarus) or pinditaka (?) wood, in cases of obstructed delivery of the fætus. Caraka[1] mentions fumigation of the vagina by burning Bhurjapatra (Betula Bhojpatra), glass, precious stones and the slough of a snake as one of the means for removing the placenta. To remove the after pains and difficulty in micturition and defæcation, Suśruta[2] advises us to fumigate the vagina. He recommends fumigation of the uterus with purifying medicines. In fumigating these parts, the Hindu surgeons desired a local action, and did not share in the belief, held by some of the Greek gynæcologists[3] that "the uterus was an animal within the body which could wander about, being attracted by pleasant smells and repelled by disagreeable smells".[4] The Arabs also did not believe uterus to be an animal. This method of treatment was well known to the Greeks; for Hippocrates[5] writes that "fumigation with aromatics promotes menstruation and would be useful in many other cases, if it did not occasion heaviness of the head". He "directs us to take a vessel which holds about four gallons and fit a lid to it so that no vapour can escape from it. Pierce a hole in the lid, and into this aperture force a reed about a cubit in length so that the vapour connot escape along the outside of

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[1] भूर्जपत्रकाचमणि सर्पनिर्म्मोकैश्चासृग् योनिं धूपयेत्।

Caraka Saṁhitā, IV. viii.

[2] कटुकालाबुकृतवेधन सर्षप सर्पनिर्म्मोकैर्व्वा कटुतैलविमिश्रैर्योनिमुखं धूपयेत्।

Suśruta Saṁhitā, III. x.

[3] Aretæus. Morb. Acut. ii. 11.
Plato's Timeas.

[4] Græco-Roman Surgical Instruments. P. 158.
Adan's Commentary on Paulus Ægineta, Vol. I. Bk. ii. P. 636-37.

[5] See also in the Hippocratic treatises, as Nat. Mul. vii, 9; 1 Morb. Mul. ovii. 1; II Morb. Mul. xl. 20, 21; Steril. vi. 3; Superfœt. ix. 3, x. 9, II.

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the reed. The cover is then fixed on the vessel with clay."[1] Oribasius[2] and Soranus[3] used similar instruments for the purpose.

Disinfection of Rooms, Clothes, etc.

Caraka[4] says that if peacock's feather, bones of vaka bird, white mustard and red sandal wood, well powdered and mixed with ghee, be used in fumigation, the poison of a room, beddings, seats and clothes, is got rid of. Śārṅgadhara[5] advises us to disinfect a sick room by the fumes caused by burning the following substances with ghee : peacock's feather, Nim leaves (Melia Azadirachta), Vrihati, pepper, asafœtida, Jotāmāṁsī (Nardostachys jotamansi), seeds of Sālmalī (Bombax malabaricum), goat's hair, slough of a serpent, cat's fæces and ivory. Suśruta[6] advises fumigation of a sick room for a surgical patient for

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[1] Græco-Roman Surgical Instruments P. 159.

[2] Coll. x.xix.

[3] Soranus. xxiii.

[4] शिखिवर्हबलाकास्थीनि सर्षपाश्चन्दने च घृतयुक्तः।
धूमो गृहशयनासनवस्त्रादिषु शस्यते विषनुत् ॥५९॥
Caraka Saṁhitā, VI. xxv.

[5] मयूरपिच्छं निम्बस्य पत्राणि बृहतीफलम्।
मरिचं हिङ्गु मांसी च बीजं कार्पाससम्भवम्॥
छागरोमाहिनिर्म्मोकं विष्ठा वैड़ालिकी तथा।
गजदन्तस्य तच्चूर्णं किञ्चिद्घृत विमिश्रितम्।
गेहेषु धूपनं दत्तं सर्व्वज्वालग्रहान्नयेत्।
पिशाचान् राक्षासञ्छित्वा सर्व्वज्वरहरो भवेत्॥
Śārṅgadhara Saṁgraha, III. ix.

[6] सर्षपारिष्टपत्राभ्यां सर्पिषा लवणेन च।
धिरन्ह कारयेद्धूपं दशरात्रमतन्द्रितः॥
Suśruta Saṁhitā, I. xix.

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ten days, morning and evening, after the operation has been performed.

15. Tubular Instrument for Cupping.

Generally cow's horn is recommended for the purpose. It is eighteen aṅguli long, its base, forming the mouth of the instrument, is three aṅguli wide (Vāgbhaṭa).[1] It is conical in shape and the cone is said to be either curved or straight. The other end is pointed and perforated to the extent of allowing a mustard seed to pass through it. The narrow end, however, is made to assume the shape of a woman's nipple by winding thread round it. This facilitates the operation of suction by the mouth of a surgeon when the broad end is placed against any diseased area of the patient's body. Suśruta[2] mentions its use in blood-extraction. For extracting bood, the part must be scarified before its application; and to facilitate the operation, the part should be fomented (Yogaratnākara).[3] After suction, the horn is to be covered by a piece of cloth or a small bladder of animals.

Vāllūki[4] describes the śṛṅga thus :—"It is the horn of a white cow, half-moon shaped and seven aṅguli broad. The orifice

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[1] वाङ्गुलास्यं भवेच्छृङ्गं चूषणेऽष्टादशाङ्गुलं।
अग्रे सिद्धार्थकच्छिद्रं सुनम्रचुचुकाकृति॥

Aṣṭāṅga Hṛdaya Saṁhita, I. xxv.

[2] तत्प्रच्छिते तनुवस्त्रपटलावनद्धेन शृङ्गेण शोणितमवसेचयेदाचूषणात्।

Suśruta Saṁhitā, I. xiii.

[3] स्वेदं विदध्यात्कुशलश्च नाड्या शृङ्गेण रक्तं बहुशः हरेच्च।

Yogaratnākara Arbuda cikitsā.

[4] विषाणः श्वेतगोरिन्दूचक्रं सप्ताङ्गुलायतम्।
चिप्तान्तः पिचुपेशिकं योज्य वातयुतेऽञ्जि।
अङ्गुष्टे मूलवन्मूले छिद्रमग्रेऽस्य सुद्गवत्।

Vāllūki quoted in Nibandha Saṁgraha, I. xiii.

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at the base is equal in circumference to that of the base of the thumb, while the end which is perforated admits a moong. This orifice at the end is closed by a wick of cotton". Cakrapāṇidatta says that the horn should be three aṅguli long, and its orifice should be of the size of the stalk of an oleander flower.

Suśruta mentions a peculiar use of the horn[1]: the extraction of an insect, cerumen, etc. from the middle ear by means of a horn or a probe. The horn was evidently used as an apparatus for suction, and Suśruta describes suction as one of the methods of extracting śalya from the body[2]. Caraka[3] uses horns and leeches to extract venom from a snake-bite; and Suśruta also refers to it. Besides the horns and cupping glasses, suction used to be accomplished by the surgeon's mouth.

Similarly Paul[4] says that foreign bodies may be sucked out from the ears with a reed.

On the method of suction as a mode of treatment, Erichsen[5] says:— "In former days, when duels with the small swords were of frequent occurrence, persons called "suckers" who were often the drummers of a regiment, were employed to attend the wounded combatants. This treatment which was conducted with a certain degree of mystery, consisted in sucking the wound till all blood ceased be flow, and then applying a pellet of chewed

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[1] कर्णच्छिद्रे वर्त्तमानं कीटं क्लेदमलादि वा।
ग्रहणीपत्रहरेद्वीमानथवापि शलाकया।
Suśruta Saṁhitā, VI. xxi.

[2] See foot-note 3. P. 108.

[3] दंशं वा चुषेन्मुखेन यवचूर्णं पांशुपूर्णेन।
प्रच्छन् वैद्यजलौकः ग्रहणैः स्राव्यं ततो रक्तम्॥
Caraka Saṁhitā, VI. xxv.

[4] Paul. VI. xxiv. and III. xxiii.

[5] Erichsen's Surgery, Vol. 1, p. 341.

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paper or a piece of wet linen to the orifice; in this way it would appear that many sword thursts traversing the limbs were healed in a few days. The process of suction cleared the wound thoroughly of all blood, and drawing the sides into close apposition, placed the parts in the most favourable condition possible for union by primary adhesion. This practice might, perhaps, in many cases advantageously imitated in the present day by means of a cupping glass and syringe".

We also find Suśruta[1] describing a vasti yantra in the treatment of snake-bite. The tube is open at both ends, one end is applied to the part bitten by the snake, while to the other end the surgeon puts his mouth to suck out the poison. So this vasti yantra may be compared to the modern aspiration syringe.

Cupping instrumunts of metal or horn are still used by the Arabs in Kordofan and Sir R. Pasha[2] suggests that cupping is possibly borrowed by the west from the "most perfect physicians" the Arab. But now we are confident that the credit is due to the Hindus.

ALĀBU YANTRA.

Alābu or gourd is described to be made of the bark of the succulent fruit called alābu (Lagenarea Vulgaris). The pulp is scraped away and the bark is allowed to dry. Such a bark should be selected which is twelve and eighteen aṅguli in length and circumference respectively. Its mouth should be circular and should have a diameter of three or four aṅguli. A fire is to be lit inside it by burning a strip of dry cloth to produce a vacuum, and the

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[1] प्रतिपूर्य्य मुखं वस्तेर्हितमाचूषणं भवेत्।
Suśruta Saṁhitā, V. v.

[2] *Vide* Third Report, Wellcome research laboratory at Gordon. P. 316.

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instrument to be applied instantly to the intended part of the patient's body. It should be thus used to drain blood and phlegm from the body (Vāgbhaṭa[1]). In modern times cupping glasses are used for like purposes in a similar manner.

Vāllūki[2] describes the alābu yantra thus:—"The mouth of the instrument is well formed and has the diameter of four aṅguli. The body has the circumference of eight aṅguli and is well smeared with a paste of black mud. It is used for drawing out blood". In yogaratnākara[3], śṛṅga and alābu are directed to be used for extraction of blood from accidental wounds. Caraka mentions the use of alābu for blood-extraction[4].

Another instrument known as the ghaṭī yantra was used exactly in the same way[5]. It is said to consist of a brass pot

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[1] साङ्गादशाङ्गुलोऽलाबुर्नाड्या त्वष्टा दशाङ्गुलः।
चतुरङ्गुल वृत्तास्यो दीर्घोऽन्तः श्लेष्मरक्तहृत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] अष्टाङ्गुलपरीणाहा चतुरङ्गुलनालसम्मिता सुमुखी कृष्णमृदालिप्ता तनुः श्लेष्टा रक्तावसेचनेऽलाबुरिति।

Vāllūki quoted in Nibandha Saṅgraha I. xiii.

सान्तर्दीपयाऽलाब्वा।

Suśruta Saṁhitā, I. xiii.

[3] छिन्ने भिन्ने तथा विद्धे क्षते सद्यो भिषग्वरः।
पट्टसूत्रेण संबध्य दृढं व्रणं व्रणविशारदः॥
मुहुर्मुहुर्यथा दुःखं ना प्राप्नोति व्रणी नरः।
अथवा दीप्यलवणपोटल्या स्वेदयेत्मुहुः॥
सन्तप्तया तप्तलोहपात्रसंयोगतः क्रमात्।
दुष्टं रक्तं स्थितं चापि शृङ्गालाब्वादिभिर्हरेत्॥

Quoted in Yogaratnākara.

[4] रुधिरागमार्थमथवा शृङ्गालाबुभिराहरेत् रक्तम्—

Caraka Saṁhitā, VI. vii.

[5] तद्दघटीहिवा गुह्य विलयोन्नमने च सा।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

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which is still used commonly in India by all classes of people for drinking purposes. A fire should be lit inside as before and the ghaṭī applied to the surface of the body covered by a piece of cloth. It soon becomes firmly fixed and is thus used to raise abdominal tumours by means of it for purposes of correct diagonosis and also to effect its cure by subsidence. It is still used by the common people for the same ends.

Caraka[1] says:—"After the abdominal tumour has been relaxed or softened a little by fomentation and oleaginous application, it is to be covered by a piece of cloth. Then inside a small ghaṭī, a fire is to be lit by burning kuśa and other forms of grasses; the pot is then to be inverted and pressed over the part covered by the cloth. By this way, the tumour would be drawn upwards *i,e.* be made prominent. The ghaṭī is then to be taken away and after removing the cloth, and examining the extent of the tumour, it is to be incised. The different shapes of the incisions are called vimārga, ajapada and ādarśa. After incision, the tumour is to be pressed and rubbed with fingers. But the intestines and the heart must not be touched."

The extraction of blood by means of cups, has been practised from remote antiquity. It is interesting to note that both the Latin and Greek terms—*cucurbitula* and σικυα signify a gourd;

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[1] स्निग्धस्विन्नशरीराय गुल्मे शैथिल्यमागते ॥
परिवेष्य प्रदीप्तांस्तु वल्वजानथवा कुशान् ।
भिषक् कुम्भे समावाप्य गुल्मं घटमुखं क्षिपेत् ॥
स संगृहीतो यदा गुल्मस्तदा घटमधोहरेत् ।
वस्त्रान्तरं ततः कृत्वा भिन्द्याद्गुल्मप्रमाणवित् ॥

Caraka Saṁhitā, VI. v.

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and we know that Alābu also means a gourd. It is curious that the instrument should have been known to the ancient Hindus and Greeks by the same name.

Prosper Alpinus[1] (16th century) who wrote a book on the state of medicine in Egypt in his time, gives drawings of cupping horns he saw there. The horns were those of young bulls, highly polished, with a small hole at the top, by which the air was extracted by suction. To close the orifice a small tab of parchment was taken into the mouth and affixed by the tongue. The Egyptians also used cupping glasses, by suction and not by fire, a method evidently unknown to them.

Hero of Alexandria (B. C. 285—222) describes an interesting form of cup. Milne summarises his account thus:[2]—"The figure shows a cup of ordinary flattened form, divided into two by a diaphragm. Two tubes pass through the fundus, one passing through the diaphragm, the other not. Each of the tube is fitted with another which is open at its inner end but closed at its outer end and provided with a small cross bar to rotate it. Each of these sets of tubes is perforated by small openings. In the case of the short tubes, these are outside the cup, in the case of the long tube they are inside the cup, in the chamber shut off by the diaphragm. By rotating the piston these openings can be placed in apposition or not at will, thus forming valves. Open valve A by placing the hole in apposition. Close valve B by turning the holes away from each other. The inner chamber of the cup is now shut off except for the small hole A. Apply the mouth to the valve A, and suck the air out of the chamber. Close valve A. Apply the cup to the affected part. The advantage

[1] De Med. Aegyptiorum. Ed. 1541 lib. ii. ch. xii. p. 139.

[2] Græco-Roman Surgical Instruments. P. 104.

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of this arrangement is that the affected part is not directly sucked upon by the mouth ; and the instrument is therefore more pleasant for the operator to use".

Celsus[1] thus describes the different kinds of cups :—"There are two kinds of cups, bronze and horn. The bronze is open at one end and closed at the other; the horn, open at one end, as in the previous case, has at the other end, a small foramen. Into the bronze kind, burning lint is placed, and then the mouth is fitted on and pressed until it sticks. The horn is placed empty on the body, and then by that part where the small foramen is, the air is exhausted by the mouth, and the cavity is closed off above with wax and it adheres in the same way as before. Either may advantageously be constructed, not only of these varieties of materials but of another substance. If other things are not to be had, a small cup or a narrow mouthed jar will answer the purpose. When it has fastened on, if the skin has previously been cut with a scalpel, it extracts blood ; but if it be entire, air".

Paul[2] remarks that "those which are made with longer necks and broader bellies are possessed of a strong power of attraction." Both Oribasius[3] and Aretaeus[4] allude to them. Antyllus says that there are three materials of which cups are made—glass, horns, and bronze. A good number of such cups occur in the Naples, British and Scottish National Museums.

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[1] Celsus. II. xi.

[2] Paulus Ægineta. VI. xii.

[3] Med. Coll. VII. xvi.

[4] De Morb. Acut. I. 10.

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Albucasis[1] gives a full account of dry cupping. In applying the instrument he advises us either to create a flame in it, or to fill it with hot water. He gives drawings of various instruments of cupping. Rhases speaks of applying a glass or a cupping instrument to draw off blood after leeching. The other Arabians give little additional information.

In modern times, cupping glasses are used in the same way as before.

V. Śalākā or Rods.

The rods, or pricker-like instruments, or probes are described to be of various kinds and are recommended to be used for various purposes[2]; so their length and circumference would vary according to some special uses required of them. Suśruta[3] says: "There are two kinds of śalākā with their ends shaped like the head of the earthworm. They are used for probing abscesses and sinuses.

Two śalākā have their ends shaped like the wing of an arrow. These are to be used for raising any part for the purpose,

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[1] Albucasis, Chirrug. ii. 98.

[2] नाड़ीव्रणान् शल्यगर्भानुन्मार्ग्युत्सङ्गिनः शनैः।
करीरवालाङ्गुलिभिरेषण्या वैषयेद्भिषक्।

Suśruta Saṁhitā. IV. i.

[3] शलाकायन्त्राण्यपि नाना प्रकाराणि नाना प्रयोजनानि यथायोगपरिणाहदीर्घाणि च तेषां गण्डुपदशरपुङ्खसर्पफण वड़ीशमुखे द्वे द्वे एषण व्यूहनचालनाहरणार्थमुपदिश्येते। मसूरदलमात्रमुखे द्वे किञ्चिदानताग्रे स्रोतोगतशल्योद्धरणार्थं। षट्कार्पासकृतोष्णीषाणि प्रमार्ज्जन क्रियासु। त्रीणि दर्व्याकृतीनि खल्लमुखानि क्षारौषधप्रणिधानार्थं। त्रीण्यन्यानि जाम्बवदनानि त्रीण्यङ्कुशवदनानि षड़वाग्निकर्म्मस्वभिप्रेतानि। नासार्वुदहरणार्थमेकं कोलास्थिदलमात्रमुखं खल्लतीक्ष्णोष्ठं। अञ्जनार्थमेकं कलायपरिमण्डलमुभयतो मुकुलाग्रं। मूत्रमार्गाविशोधनार्थमेकं मालतीपुष्पवृन्ताग्रप्रमाणपरिमण्डलमिति।

Suśruta Saṁhitā, I. vii.

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after incision, of extracting any foreign body from it. Others assign to them the function of bringing together the lips of the wound caused by an abscess being opened and emptied.

Two śalākā have their ends shaped like the hood of a snake. They are useful for transferring any material from one part to another. Some of the simple probes used by the ancient Greek and Roman surgeons carried a single or double snake of Æsculapius at one end. But evidently it was meant as an ornamentation and served no useful purpose.

Two śalākā have their ends shaped like a fish-hook but are blunt. They are used for extracting any extraneous material from the muscles or bones".

The last six kinds of Suśruta are practically the same as the six śaṅku of Vāgbhaṭa,[1] which are the following :—

The śaṅku are six in number. Amongst these, two are twelve and sixteen aṅguli long respectively. They are used for the purpose of raising a foreign body upwards from the wound.

Two varieties have their ends shaped like the hood of a snake. They are ten and twelve aṅguli long ; and they are used for the purpose of moving a foreign body in the wound in all directions.

Two varieties have the shape of a fish-hook—the ends resembling the stem of an arrow. These are used for the extraction of foreign bodies from the wound.

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[1] शङ्कव: षड्भौ तेषां षोड़शद्वादशाङ्गुली ।
व्यूहने ऽहि फणावक्त्रौ दौ द्वादश दशाङ्गुली ॥
चालने शरपुङ्खा सप्त वाहार्ये वड़िशाकृति: ॥२५

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxv.

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Suśruta[1] mentions another pair of śalākā which have their ends shaped like a masūra pulse, and slightly curved ; these are used for the purpose of extracting a foreign body from the external outlets of the body such as mouth, nose, etc. They are eight and nine aṅguli long respectively.

Swab Probes.

Six śalākā are used for the purpose of wiping out the principal excretory canals of the body *viz.*, rectum, nose and ears.[2] Their ends are covered with cotton like a head-dress (pāgḍī). The two śalākā intended for the rectum, have the lengths of ten and twelve aṅguli respectively for short and long distances. So the two varieties of probes for the ears are eight and nine aṅguli long, while the other two kinds of probes for the nose are six and seven aṅguli long respectively. Some commentators are of opinion that these six śalākā are meant for clearing abscesses.

For similar purposes the Greek and Roman surgeons used the spathomele or spatula probe. Priscianus[3] writes: "First of all we must frequently wipe away the clots of blood from the nose

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[1] See foot note 2, P. 155.

उभेगण्डपदमुखे स्रोतस्य: शल्यहारिणी।
मसूरदलवक्त्रे द्वे सप्ताता मष्टनवाङ्गुली ॥२४

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxv.

[2] कार्पास विहितौष्णीषा: शलाका: षट्प्रमार्जने।
पायावासान्न दूरार्थे द्वे दश द्वादशाङ्गुली।
द्वे षट् सप्ताङ्गुली घ्राणे द्वे कर्णेऽष्टनवाङ्गुली ॥२८॥

Ibid.

[3] Priscianus. xiv.

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with the end of a spathomele wrapped on the 'berry' with soft wool, and then occlude it by plugging with wool in the same way."

The use of probes, having the ends wrapped with wool, for wiping out discharge of pus from the ears of horse, is mentioned by Jayadatta Suri[1] in his Treatment of Horses.

Spoon-shaped Probes.

Three probes are described to have their ends shaped like a khala or mortar with a conical cavity, and so they resemble a spoon. They are to be used for the purpose of applying caustic solutions, etc.[2]

Similarly cyathiscomele, which is a variety of spathomele in which the spatula is replaced by a spoon, is said to have been used by the Greek surgeons to mix, measure and apply medicaments. The specimens of these instruments occur in the Naples Museum. Sometimes the edge of the spoon is sharp and is recommended to be used as a curette. Scrivonius Largus dircets us to use the spoon of an ear specillum for the application of caustics to hæmorrhoids.

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[1] पूयस्रावेण जानीयात् शोथमभ्यन्तरोद्गम् ।
पिचुना वेष्टयित्वा तु शलाकाग्रं समाहितः ॥
तेन कर्णान्तरे पूयं कर्षयित्वा विचक्षणः ।
पातितस्य सुवद्धस्य पूरयेन्मधुसर्पिषा ॥

Aśvavaidyaka, Ch. 34, v. 2. and 3.

[2] See foot-note 2, P. 155.

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Nail-shaped Probes.

Vāgbhaṭa[1] describes three other probes for the same purpose. They are eight aṅguli long; their ends are bent and resemble in size and shape the nails of the third, fourth, and fifth fingers respectively.

Paul[2] mentions a nail-shaped probe in the treatment of bubonecele. But this was applied as a cautery and not for the application of medicaments. Nail-shaped cauteries are also referred to by Hippocrates[3] in the treatment of recurrent dislocation of the shoulder-joint.

Jāmvovauṣṭha Probes.

Three probes are called Jāmvovou-ṭha for their ends are shaped like the fruit of Jambul tree (Eugenia jambolanum).[4] Three other śalākā have their ends shaped like aṅkuśa or elephant driver's goad.[5] They may be made of any length required

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[1] अष्टाङ्गुला निम्नमुखा स्तिस्रः चारीषघ क्रमे ।
कनीनी-मध्यमाऽनामी-नखमान-समैर्मुखैः ॥

Aṣṭānga Hṛdaya Saṁhitā, I. xxv.

[2] Paulus Ægineta, VI. lxv.

[3] Hippocrates iii. 15.

[4] See foot-note 2, P. 155.

शलाका जाम्बवौष्ठानां चारिःग्रौ च पृथक् त्रयं ।
युञ्जात् स्थूलानु द्वीर्घानां,

Aṣṭānga Hṛdaya Saṁhitā, I. xxv.

[5] See foot-note 2, P. 155.

For the diagram of the aṅkuśa see Fergusson's Tree and Serpent Worship; Plate xxxiii. Sanchi. xxxvii. fig. I. and xxxviii. fig. 1 & 2.

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by the surgeon. These six varieties are recommended for the purpose of applying caustic medicaments and the actual cautery.

Paul[1] mentions a gamma-shaped cautery in the radical cure of hernia. This cautery is shaped like the Greek letter Γ; so it resembles the aṅkuśa cautery of the Hindus. The aṅkuśa is similar in appearance to the Greek letter.

One variety, which is used for the purpose of removing a tumour from the interior of the nasal cavity, has its end shaped like a khala or mortar, with sharp edges, and of the size of half the stone of the fruit of the jujube tree (Ziziphus jujuba)[2]. Vāgbhaṭa[3] mentions a similar probe for the purpose of applying actual cautery to a nasal tumour. Its end resembles in shape and size, a half of the stone of the fruit of the jujube tree.

This spoon-shaped probe of the Hindus is comparable to the curette like sharp cyathiscomele of the Greeks, noted before.

Collyrium Probes.

For the purpose of applying collyria to the eyes, a rod is mentioned having the length of eight aṅguli and the thickness of a pea. Its both ends are shaped like buds[4].

The probes for applying collyria to the eyelids, should be six aṅguli long, with a rounded bulbous end. They may be made of gold, or silver, or copper, or iron, or stone. For the habitual use of collyria, a lead probe is prescribed. When medicines are directed

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[1] Paul, VI. lxii.

[2] See foot-note 2, P. 155.

[3]. कोलास्थि दल तुल्या स्था नासार्शोऽर्बुद दाहकृत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[4] See foot-note 2, P. 155.

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to be applied not only to the lids but also to the conjunctiva, the finger is recommended as it is a softer and safer instrument. Again the probes would vary according to the nature of the collyria to be used. As for the application of lekhana collyrium, the probe should be made of copper and should be ten aṅguli long. The probe is advised to be made thinner at its middle to afford a firm grasp by the surgeon. The ends are shaped like buds. For applying ropaṇa collyrium, a similar probe is to be used, but it should be made of steel; while for the application of a collyrium for the improvement of the visual strength, a probe made of gold or silver, and having the size and shape of a finger is recommended by Cakradatta.[1]

Suśruta[2] likes a probe of steel, or bell-metal, or copper for lekhana collyrium; and of gold, or silver, or horn, for ropaṇa and snehana collyria. The probe should be eight aṅguli long, and the eye is to be kept open and fixed by the left hand, while the right hand is to hold the probe, and so the collyrium is to be applied to the eye.

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[1] दशाङ्गुला तनुर्मध्ये शलाका सुकुलानना ॥
प्रशस्ता लेखने तासौ रोपणे काललोहजा ।
अङ्गुलीव सुवर्णोत्था रूप्यजा च प्रसादने ॥

Cakradatta. Āschyotana Cikitsā.

[2] तेषां तुल्यगुणान्येव विदध्याद् भाजनान्यपि ।
सौवर्णं राजतं शाङ्खनाभं वैदूर्यकांस्यजं ॥
आयसानि च योज्यानि शलाकाश्च यथाक्रमं ।
वक्त्रयोर्मुकुलाकारा कलाय परिमण्डला ॥
अष्टाङ्गुला तनुर्मध्ये सुकृता साधुनियहा ।
औड्वर्थग्रमजातानि शारीरी वा हिता भवेत् ॥

Suśruta Saṁhitā. VI. xviii.

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Śārṅgadhara[1] says: "The collyrium probe should be made of stone or metal. It should be eight aṅguli long and its ends must be made smooth and rounded like a common pea. For lekhana collyrium, a copper, or iron, or stone probe is to be used, while for ropaṇa collyrium the tip of the finger is recommended for its softness."

Of the probes used by the Hindus for applying collyrium to the eyes, fortunately we possess a few specimens. Among the objects of interest found in the excavations at Bijnor, we find, "fourthly, one copper salai or instrument for applying antimony to the eye, similar to those found in the Bihat excavations."[2]

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[1] सुखयो: कुण्ठिता श्लक्ष्णा शलाकाष्टाङ्गुलोन्मिता।
अश्मजा धातुजा वा स्यात् कलायपरिमण्डला॥
ताम्रलोहाश्मसंजाता शलाका लेखने मता।
सुवर्णरजतोद्भूता शलाका रोहणे मता।
अङ्गुलीच मृदुत्वेन कथिता रोपणे बुधैः॥

Śārṅgadhara Saṁgraha. III. xiii.
Yogaratnākara. Eye Diseases. P. 823.

त्रिफल सलिलयोगे भृङ्गराजद्रवे च
हविषि च विषकल्के चीर आजे मधूके।
प्रतिदिनमथ तप्तं सप्तधा सीसमेकं
प्रणिहितमथ पश्चात् कारयेत् तच्छलाकाम्॥
सवितुरुदयकाले साञ्जना व्यञ्जना वा
करकरिकसमेतानर्म्मपेक्ष्यिरोगान्।
असितसित समुत्थान सन्धिवर्त्माभिजातान्
हरति नयनरोगान् सेव्यमाना शलाका।

Cakradatta, Netraroga Cikitsā.

[2] "Vide Princep's (Thomas') Indian Antiquities, fig. 18. pl. iv" J.A.S.B. IX. 1. 7.

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Specillum with two olivary ends formed a variety of probe of the Greek and Roman surgeons. It was used as an ordinary probe in dealing with crooked fistulæ, and as a cautery to destroy the roots of hairs after epilation. Sometimes it carried an eye in one of its olives and was used in the treatment of nasal polypus. The eye was threaded with a cord having many knots along it. The other end of the probe was pushed through the nose and withdrawn by the mouth, and then by a sawing movement of the cord with both hands of the surgeon, the polypus was removed.[1] A single probe for the application of semi-solid medicaments, occurs in the outfit of the oculist of Rheims, in the museum at St. Germain-en-Laye and is figured by Milne.[2]

KARṆA-ŚODHANA OR EAR-CLEANER.

This śalākā is said to have its end shaped like the end of a leaf of Aśvattha (Ficus religiosa). The instrument looked like a sruva—one of the famous spoons used in sacrificial ceremony.[3] It was used for the purpose of extracting wax from the ears.

The different kinds of spoons used in the ancient Hindu ceremonies were as follows: "Three different sruk or offering-spoons are used *viz.*, the guhu, upabhrit and drubha. They are made each of a different kind of wood, of an arm's length (or according to others, a cubit long) with a bowl of the shape and size of the hand, and a hole cut through the bark and front

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[1] Paul VI. lxxxvii, VI. xiv, VI. xxv.

[2] Græco-Roman Surgical Instruments, pl. xi. fig. 5.

[3] कर्णशोधनं मश्वत्थ पत्र प्रान्तं सुवाननं ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

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side of the bowl and fitted with a spout, some eight or nine inches long and shaped like a goose's bill. The sruva or dipping-spoon, on the other hand, chiefly used for ladling the clarified butter (or milk) from the butter vessel into the offering-spoons, is of the khadira wood (Accacia catechu), a cubit long, with a round bowl measuring a thumb's joint across and without a spout".[1]

So we see that the bowl of the karṇa-śodhana was round in shape.

Suśruta also mentions a śalākā for the extraction of cerumen or minute insects from the ears.[2] Cakrapāṇi[3] alludes to it. In modern times, the ear-cleaner, as used commonly in India, is a tāla yantra. Ear specillum is frequently mentioned by the Greeks and Romans. It consisted of a small narrow scoop at one end and a simple probe at the other. The use of the scoop is thus described by Archigenes[4]: "If a bean, stone, etc. fall into the ear, remove it with the small narrow scoop of the ear specillum". Celsus[5] directs us to extract a scab or cerumen by means of the ear specillum.

The ear scoop used by the modern surgeons is a narrow scoop, more like the Hindu pujā vessel known as kuśi. The ear scoop is often made in combination with a director.

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[1] Śatapatha Brâhmaṇa, Sacred Books of the East. 1. 3. 1. 1. foot-note.

[2] See foot note 1, P. 149

[3] क्लेदयित्वा तु तैलेन स्वेदेन प्रविलाय्य च।
शोधयेत् कर्णगूथस्तु भिषक् सम्यक् शलाकया॥
Cakradatta, Karṇaroga.

[4] Galen. XII, 652.

[5] Celsus. VI. viii.

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GARBHA-ŚAṄKU. FŒTUS OR TRACTION HOOK.

The end of this instrument is said to have been bent like aṅkuśa or elephant driver's goad. It is described to have the same length as the other śaṅku have *i. e.* ten to sixteen aṅguli, and it is eight aṅguli in width.[1] It is recommended for extracting a dead fœtus from the mother's womb, after perforating its head by the maṇḍalāgra or mudrikā knife. Suśruta recommends us to perforate the head and then to extract the bones by the śaṅku or hook, and lastly to apply traction by fixing it about the chest or axilla. If the head can not be perforated, it is to be applied to the eyes or cheeks.[2]

Traction hook for extraction of a dead fœtus was well known to the ancients. Hippocrates[3] bids us break up the head of the fœtus with a cephalotribe and remove the bones with bone forceps, or deliver it by a traction hook inserted near the clavicle. Celsus[4] advises us to insert a smooth hook with a short point and to fix it in the eye, or the ear, or the mouth, or the forehead, and so the fœtus is to be dragged down. Soranus points out the best places for the insertion of the hook to be the eyes, the occiput, the mouth, the clavicles, and the

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[1] नतोऽग्रे शङ्कुना तुल्यो गर्भे शङ्कुरितिस्मृतः।
अष्टाङ्गुलो यतस्तेन मूढगर्भं हरेत् स्त्रियाः॥ १६।

Aṣṭāṅga Hṛdaya Saṁhitā I. xxv.

[2] तत स्त्रियमाश्वास्य मण्डलाग्रेणाङ्गुलीशस्त्रेण वा शिरोविदार्य शिरःकपालान्याहृत्य शङ्कुना गृहीत्वोरसि कक्षायां वापहरेदभिन्ने शिरसि चाचिकूटे गन्डे वा।

Suśruta Saṁhitā, IV. xv.

[3] Hippocrates. II. 70.

[4] Celsus. VII. xxix.

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ribs in head presentations; and the pubes, ribs, and clavicles in footling cases.[1] Soranus, Aetius[2] and Paul[3] direct us to extract the fœtus in the same way but they recommend us to use two hooks instead of one, in order that the pulling may be straight down and not to one side.

Albucasis,[4] Rhases,[5] Haly Abbas,[6] and Avicenna[7] give similar directions for opening the child's head and for delivering the fœtus with hooks.

This purpose in modern times is served by the blunt hook and crotchet.

Yujña-śaṅku of Midwifery Forceps.

An instrument is thus named and figured by modern writers on Hindu surgery, bearing some resemblance to the modern forceps, for extracting the child alive. We have, however, no mention of any such instrument in the works of Caraka, Suśruta Vāgbhaṭa and other ancient authorities. The Greeks and Romans were also ignorant of it; and the Arabians fared no better, though Adams, in his commentary on Paul[8] asserts that Avicenna refers to forceps for the delivery of living childern. Mulder, in his valuable work,[9] gives an extract from a translation from the works of Avicenna supporting

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[1] Soranus. II. xix.
[2] Aetius. IV. iv. 23.
[3] Paul. VI. lxxix.
[4] Albucasis. Chirrug. II. 76 and 77.
[5] Rhases. Cont. xxii.
[6] Haly Abbas. Pract. ix. 57.
[7] Avicenna. iii. 21, i, 24.
[8] Paulus. Æginita. III. lxxvi.
[9] Historia Forcipum et Vecticum. p, 6.

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the same conclusion. Smellie[1] says: "With regard to the fillets and forceps, they have been alleged to be late inventions; yet we find Avicenna recommending the use of both. The forceps recommended by Avicenna is plainly intended to save the fœtus". "He recommends all the old methods for assisting in natural labours; and if the woman can not be delivered by these, he orders a fillet to be fixed over the head: if that can not be done, to extract with the *forceps*; and should these fail, to open the skull; by which means the contents will be evacuated, the head diminished, and the fœtus easily delivered."[2] Playfair[3] also holds the same view. The point is however by no means settled. For Milne[4] says: "A full consideration of Avicenna's words seems to me to lead to the conclusion that he is describing no more than extraction with a craniotomy forceps. If the forceps fail, the child is to be extracted by incision, as in the case of a fœtus already dead (and decomposed so that the forceps would not hold)."

Thus we may be sure that there is no availale evidence of the use of delivery forceps by the Hindus, Greeks, Romans and Arabs; and the Chamberlens are still the undisputed claimants to the glory of the invention.

But there is no doubt that the Hindu surgeons tried extraction of the living fœtus by manual traction. The hands are recommended to be well oiled and introduced into the uterus. If the child be dead, sharp intruments are advised to be intro-

[1] Smellie. Treatise on Midwifery, p. 40.

[2] Ibid, Edited by McClintock. New Syd, Soc, vol. I. Introduction p. 50.

[3] Researches on Operative Midwifery, p. 10.

[4] Græco-Roman Surgical Instruments. p. 156.

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duced into the vagina for cutting upon the fœtus. But on no account such instruments are to be used so long as the child is alive.[1]

Sarpa-phaṇā or Snake's Hood.

It is also called agra-bakra *i. e.* the end bent. It is a śaṅku or hook similar to the above, the end being bent like the hood of a snake.[2] It is to be used for the purpose of extracting stone after operation.

Suśruta, in the operation for extraction of stone through the perineal incision, directs us to use the agra-bakra to bring the entire stone out of the wound. But in the case of females, he recommends us to use a knife having a spoon like a scoop, to prevent the formation of a vescico-vaginal fistula.[3] Is it a spoon-shaped knife, or is it a double instrument on a handle—a knife at one end and a scoop at the other? The Greeks used a knife having a scoop at the end.

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[1] गर्भे जीवति मूढ़े तु गर्भं यत्नेन निर्हरेत्।
हस्तेन सर्पिषाक्तेन योनेरन्तर्गतेन सा॥
मृते तु गर्भे गर्भिन्या योनौ शस्त्रं प्रवेशयेत्।
शस्त्रशास्त्रार्थविदुषी लघुहस्ता भयोज्झिता।
सचेतनं तु शस्त्रेण न कथञ्चन दारयेत्॥

Yogaratnākara, Muḍḍhagarva Cikitsā.

[2] अश्मर्थाहरणं सर्पफणावद्वक्त्र अयतः॥

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxv.

[3] यथा च न भिद्यते न चूर्ण्यते वा तथा प्रयतेत चूर्णमल्पमप्यवस्थितं हि पुनः परिवृद्धिमेति तस्मात् समस्तामयवक्त्रेणादद्दीत। स्त्रीणान्तु वस्तिपार्श्वगतौ गर्भाशयः सन्निकृष्टः तस्मान्ना सामुत्सङ्गवक्त्रस्य पातयेदतोऽन्यथा खल्वासां मूत्रस्रावी व्रणो भवेत्।

Suśruta, Saṁhitā. IV. vii.

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Celsus[1] describes the extraction of stone through a perineal section by means of the lithotomy scoop. "The scoop is slender at the end and flattened out in the shape of a semi-circle, smooth externally where it comes in contact with the tissue, rough internally where it meets the calculus". It was a long hook-like instrument.

Aetius[2] mentions a special stone extractor, under the treatment of calculus in the female. Some understand by it the lithotomy forceps.

In modern times we use the lithotomy forceps and scoop for the same purpose.

I take this opportunity of referring to the celebrated passage in the famous Hippocratic oath, which runs as follows: "I will not cut persons labouring under the stone, but will have this to be done by men who are practitioners of this art". This sentence has given a good deal of trouble to the commentators and they have failed to understand the true reasons as to why Hippocrates specially forbade the practice of this operation. "M. Littré finds some difficulty in accounting for the circumstance that the noviciate in surgery is interdicted from the operation of lithotomy." Adams,[3] commenting on the sentence, says: "Why this operation was proscribed, can not indeed be satisfactorily ascertained," and he quotes the Arab Physician, Avenzoar[4], who "pronounces the operation to be one, which no respectable physician would witness, and far less to perform."

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[1] Celsus. vii. xxvii.

[2] Aetius. IV. iv. 94.

[3] The Genuine Works of Hipprocrates. Vol. II. P. 777—8.

[4] Avenzoar. II. 2, 7.

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The explanation that this was proscribed because there were men who devoted themselves exclusively to this kind of treatment, and that if the qualified surgeons be allowed to practise the operation, they would interfere in the sphere of action of the lay lithotomists, cannot be considered satisfactory. For the question still remains the open one, why should Hippocrates proscribe this operation from the domains of scientific surgery, simply because a few laymen happened to practise it.

The real explanation is that in Hippocrates' time success in the operation was very difficult to achieve, consequently he interdicted the operation much in the same way as abdominal operations were considered sacred before the days of antiseptic surgery. It is curious to find that Suśruta calls this operation the worst of all surgical operations, for he says[1]: "Even experienced and able surgeons fail to attain success by operation for the stone. So the surgical treatment is the worst of all treatment here. But if you do not operate, the patient will die; and it is doubtful whether he will live after the operation; so give him the chance of operation in God's name." I do not know whether this passage of Suśruta has any causal relation to the remarks of Hippocrates, but there is no doubt that the former serves as a better commentary on the latter, than anything hitherto suggested.

Adams[2] says that this operation was practised by a class of men,

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[1] कुशलास्यापि वैद्यस्य यतः सिद्धिरिहाध्रुवा।
उपक्रमो जघन्योऽयमतः स परिकीर्तितः॥
अक्रियायां ध्रुवो मृत्युः क्रियायां संशयो भवेत्।
तस्मादापृच्छ्य कर्तव्यमीश्वरं साधुकारिणा॥

Suśruta Saṁhitā. IV. vii.

[2] Commentary on Paulus Æginetæ. Vol. II. P. 363.

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separate from the surgeons, in all countries in ancient times, and points out that the ancient operation of lithotomy is still practised with great success by the native doctors of Hindusthan. No conclusion is, however, to be drawn from the modern practices in India, as we find separate classes of men not only for stone, but also for bone-setting, cataract, etc. And whatever may be the practice in modern times, we find that during Suśruta's time, the operation was not the privilege of the laymen.

Śarapuṅkha-mukha Probe.

This instrument is also described to have its end bent like the hood of a snake. It is four aṅguli long and is recommended to be used for the purpose of extracting a tooth from its socket.[1]

Tooth elevator or instrument for levering teeth is mentioned by Galen.[2] It is of the same size as the bone lever which, according to Paul,[3] is seven or eight aṅguli long.

This instrument resembles in shape and action the tooth elevator of the modern surgeons.

Ardhacandra-mukha Śalā. Half-moon Probe.

The first half of this variety of śalā is curved like a half-moon, to which is attached the second half as a rounded handle.[4] Suśruta advises us to use it for the purpose of applying actual

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[1] शरपुङ्खमुखं दन्तपातनं चतुरङ्गुलम् ॥
Aṣṭāṅga Hṛdrya Saṁhitā. I. xxv.

[2] Galen. xviii. 593.

[3] Paulus Ægineta. VI. cvi.

[4] शलाकामन्यवर्त्मनि ।
मध्येऽर्द्ध वृत्तदण्डाच्च मूले चार्द्धेन्दुसन्निभां ॥
Aṣṭāṅga Hṛdaya Saṁhitā I. xxv.

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cautery to the groin in bubonecele, to prevent the hernia from entering into the scrotum.[1]

A crescent-shaped cautery was also used by the Greek and Roman surgeons. So Paul[2] says that in cases of sloughing of the prepuce we must cut it off and use lunated cauteries to stop hæmorrhage and prevent the spreading of the wound. Again he mentions a cautery shaped like the Greek letter Γ, in the radical cure of hernia.[3]

Bone lever.

Instruments for levering fractured bones into their proper positions are mentioned several times by Suśruta. In the treatment of fracture of the nasal bones, a śalākā is recommended to be used as a bone lever for raising and depressing the fractured ends.[4] Sometime a muṣala or pestle is advised to be used.[5] It is a thick wooden pestle the end of which is plaited with iron. It is still used to strike upon paddy to seperate the husk from the rice. Suśruta mentions its use to reduce dislocations of the joints of the shoulder and neck.[6]

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[1] तत्र या वङ्क्षणस्था ता: दहेदङ्गुष्ठवक्त्रया।
सम्यग्मार्गावरोधार्थं कोशप्राप्तां तु वर्ज्जयेत्॥
Suśruta Saṁhitā, IV. xix.

[2] Paulus Ægineta. VI. lvii.

[3] Ibid. VI. lxii.

[4] नासां सन्नां विवृत्तां वा ऋजुं कृत्वा शलाकया।
Suśruta Saṁhitā, IV. iii.

[5] सन्नमुन्नमयेत् स्विन्नमचक्रम् मूषलेण तु।
तथोन्नतं पीड़येच्च बध्नीयाद्गाढमेव च॥
Ibid.

[6] तैलपूर्ण कटाहे वा द्रोण्यां वा शाययेन्नरं॥
मूषलेनोत्क्षिपेत् कक्षामांससन्धौ विसंहते।
स्थानास्थितञ्च बध्नीत स्वस्तिकेन विचक्षण:॥
Ibid.

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The pestle was also used by Hippocrates[1] to reduce dislocation of the shoulder joint. He says: "Those who accomplish the reduction forcibly bending it round a pestle, operate in a manner which is natural. But the pestle should be wrapped in a soft shawl (for thus it will be less slippery), and it should be forced between the ribs and the head of the humerus. And if the pestle be short, the patient should be seated upon something, so that his arm can with difficulty pass above the pestle. But for the most part the pestle should be longer, so that the patient when standing may be almost suspended upon the piece of wood. And then the arm and forearm should be stretched along the pestle, whilst some person secures the opposite side of the body by throwing his arms round the neck, near the clavicle"

The bone lever used by the Greeks is thus described by Paul:[2] "It is an instrument of steel about seven or eight fingers' breadth in length, of moderate thickness that it may not bend during the operation, with its extremity sharp, broad and somewhat curved."

Director.

Suśruta[3] mentions the use of eṣaṇī or metallic probes not only to ascertain the course of the fistulous track but also to raise the bridge of skin covering the sinuses, so that the surgeon may operate on it as a guide. Cakradatta[4] also uses a probe to

[1] The Genuine Works of Hippocrates. Adams' Trans. p. 372.

[2] Paulus Ægineta, Vi. cvi.

[3] पक्वेषु चोपक्लिन्नमवगाढखिन्नं शय्यायां सन्निवेश्यार्शसमिव यन्त्रयित्वा भगन्दरं समीक्ष्य पराचीनमवाचीनं वा बहिर्मुखमन्तर्मुखं वा ततः प्रणिधायैषणीमुन्नम्य सावयमुद्रेच्छस्त्रेण

Suśruta Saṁhitā, IV. viii.

[4] नाड़ीनां गतिमन्विष्य शस्त्रेणापाट्य कर्म्मवित्।

Cakradatta, Nāḍivraṇa Cikitsā.

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learn the direction of the wound before operation. It is also mentioned in the Yogaratnākara.[1]

In the treatment of fistulæ, Celsus[2] also says: "A director being inserted into them down to their termination, the skin ought to be incised." It is not mentioned that the eṣaṇī or probe was grooved, but there is no doubt of its use like a grooved director, so common nowadays. The discovery of such a director, along with several other surgical instruments, which are preserved in the Muśee de Cinquantenaire, Brussels, proves that it was known to the Romans.

Urethral Probe.

A variety of śalākā is described by Suśruta[3] to have its end rounded like the stalk of a mālatī flower (Echites caryophyllata, Rox.) It is to be used for cleaning the urethral canal.

Caraka[4] mentions a probe for examining the direction of the urethral canal and its pathological condition, before introducing the tube of the urethral or bladder clysters into it.

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[1] नाड़ीनां गतिमन्वीत्य शस्त्रं स्रोतःपाट्य कर्म्मवित्।

Yogaratnākara, p. 346.

[2] Celsus, VII. iv.
Græco-Roman Surgical Instruments. p. 73.

[3] मूत्रमार्गविशोधनार्थं एकं मालतीपुष्पवृन्ताग्रप्रमाणं परिमण्डलमिति।

Suśruta Saṁhitā, I. vii.

[4] ऋजोः सुखोपविष्टस्य हृष्टे मेढ्रे घृताक्तिते।
शलाकयान्विष्य गतिं यत्रप्रतिहता व्रजेत्॥
ततः शेफःप्रमाणेन पुष्पनेत्रं प्रवेशयेत्॥

Caraka Saṁhitā, VIII. ix.

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Class VI. The Upayantra or Accessory Instruments.

The sixth class of the blunt instruments comprises the upayantra or accessory instruments. By surgical instruments, the Hindus consider not only the instruments proper, but also any mechanical aid by which the object of the surgical treatment is attained. Thus even medicinal agents are considered under this head for they help the inflammatory swellings to subside, or suppurate, or burst open as by various external applications. The accessory instruments are :

1. Rajju or Thread.

As an example of thread being used as an instrument of surgery, we know that the thread smeared with caustics are recommended by Suśruta[1]—kṣāra sūtra or caustic thread—for the operation of fistula-in-ano. For further informations on the subject see "Eṣaṇī or sharp probes" under the Śastra.

Thread as a material of phalavarti or tent is mentioned by Śārṅgadhara.[2] If after a vaginal or intra-uterine douche, the injection does not flow out, he advises us to introduce a strong tent made of thread, dipped in oleaginous medicines of the

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[1] क्लशदुर्व्वलभीरूणां नाड़ीमर्म्मश्रितांच या।
चारसूत्रेन छिन्द्यान्नतु शस्त्रेण बुद्धिमान्॥
Suśruta Saṁhitā, IV, xvii.
Cakradatta, Nāḍīvraṇa Cikitsā.

[2] फलवर्त्तिं निदध्याद्वा योनिमार्गे दृढ़ं भिषक्।
सूत्रैर्द्विनम्मितां स्निग्धां शोधनद्रव्यसंयुतां॥
Śārṅgadhara Saṁgraha, III. vii

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śodhana (Purifier) group. Cakradatta[1] uses caustic threads in the treatment of piles by ligature.

2. Veṇikā or Twine.

The use of twine as a ligature to be applied above the part bitten by a snake to arrest the circulation of blood towards the heart is mentioned by Suśruta.[2] Caraka[3] also advises us to tie ligatures above and below the bitten part, then to squeeze out the poison towards the wound, whence it is to be drawn out through incisions made by a knife.

3. Paṭṭa or Bandages.

For the proper application of bandages, Suśruta mentions the following materials to be necessary :[4] *viz.*, cloth manufactured

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[1] भावितं रज्वनीचूर्णैः स्नुहीचीरे पुनःपुनः।
बन्धनात् सुदृढं सूत्रं भिनत्त्यर्शो भगन्दरं॥
Cakradatta, Arśaroga Cikitsā.

[2] सा तु रज्वादिभिर्बद्धा विषप्रतिकरीमता।
Suśruta Saṁhitā, V. v.

[3] दंशात् तु विषं दष्टस्य विसृतं वेणिकां भिषक् बद्धा।
निष्पीड्येदृक्शं दंशमुद्धरेन्मर्म्म वर्ज्जम्॥
Caraka Saṁhitā, VI. xxv.

[4] अत ऊर्द्धं व्रणबन्धन द्रव्याण्युपदेक्ष्यामः। तद्यथा क्षौमकार्पासविकदुकूल कौशेय पत्तोर्ण चीनपट्टचर्म्मान्तर्व्वल्कलालाबूशकललता विदलरज्जुतूलफलसन्तानिका लौहानीति तेषां व्याधि कालं चावेक्ष्योपयोगः प्रकरणतश्चैषामादेशः। तत्र कोशदामस्वस्तिकानूवेल्लितप्रतोली-मण्डलस्थगिकायमकखट्वाचीनविबन्धवितानगोफणाः पञ्चाङ्गी चेति चतुर्दशबन्धविशेषाः।

तेषां नामभिरेवाकृतयः प्रायेणव्याख्याताः। तत्रकोशमङ्गुष्ठाङ्गुलिपर्व्वसु विदध्यात्। दाम सन्धिषङ्गे। सन्धिकूर्चकभ्रूस्तनान्तरतलकर्णेषु स्वस्तिकं। अनुवेल्लितन्तु शाखासु,। ग्रीवामेढ्रयोः प्रतोलीं। वृत्तेऽङ्गे मण्डलं। अङ्गुष्ठाङ्गुलिमेढ्रगेषु स्थगिकां। यमलव्रणयो र्यमकं। हनुशङ्खगण्डेषु खट्वां। अपाङ्ग्योश्चीनं। पृष्ठदरीरःसु विबन्धं। मूर्द्धनि वितानां चिबुकनासौष्ठां सवस्तिषु गोफणां। व्रणऊर्द्धं पञ्चाङ्गीमिति। यो वा यस्मिन् शरीर प्रदेशे सुविविष्टो भवति तं तस्मिन् विदध्यात्।
Suśruta Saṁhitā, I. xviii.

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from the fibres of plants, flax, cotton, wool, blankets, silk, leather, Chinese cloth, inner barks of trees, bark of bottle gourd (Cucurbita lagenaria), tendrils of twining plants, cane or pieces of split bamboo, rope, fruits as those of Bombax Malabaricum, blades of knives, and plates of metals as gold, or lead, or iron. These articles should be used with due consideration as regards the nature of the disease, the time of their use and the purpose in hand. He describes fourteen varieties of bandages as follows:—

1. Kośa :— a hollow cylinder or sheath to be applied to the joints of the thumb and fingers. This form of bandage is to be applied over the stumps after amputation of the limbs.

2. Dāma (*i.e.* tail of a quadruped ?) :— it is a large bandage to be tied round a part for the relief of pain or cramps.

3. Svastica or a circular cross-bandage:— it is to be applied round the joints, the space between the tendons of the great and second toes, the intermammary region, the glabella (space between the eyebrows), the plantar surfaces of the feet, the palmer surfaces of the hands, and the ears. It is also the form of bandage recommended in dislocations of the shoulder joint.

4. Anuvellita or an encircling bandage :—it is to be applied to the limbs. This form of bandage is recommended to be applied to the limbs in cases of oblique, deep, and large cuts inflicted by a knife. A leather bandage applied in the form of gophaṇā would also serve the purpose. The encircling bandage is also advised in cases of fracture of the ribs.

5. Protolī :— a broad bandage for the neck and penis.

6. Maṇḍala or a circular bandage:— it is to be applied to

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the round parts of the body such as the arms, sides, abdomen, thighs, and back.

7. Sthagikā or a supporter :— a bandage enclosing a splint and pastes of medicaments to keep the parts firm. It is to be applied over the ends of the thumb, fingers, and penis. Suśruta directs us to use this bandage round the scrotum after tapping the hydrocele.

8. Yamaka or a double-bandage:— a pair of circular bandages applied to a couple of ulcers on a part.

9. Khatvā or a four-tailed bandage :— it is recommended for the temples, cheeks and lower jaw.

10. Chīna or a banner bandage :— a bandage for the inner angles of the eyes.

11. Vivandhana or a circular chest-bandage:— it is the bandage for the back, abdomen and chest.

12. Vitāna or a canopy bandage :— a large bandage for the head.

13. Gophaṇā[1] (*lit.* a sling for throwing stones) :— a concave bandage for the chin, nose, lips, shoulders and pelvis.

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[1] शाखासु प्रतितां स्तिर्य्यक् प्रहारान्विहतान् भृशं ।
सीव्येत् सम्यग्विवेश्याग्र सन्यस्थीन्यनुपूर्व्वश: ॥
वङ्का वेष्टितकेनाग्र ततस्तैलेन सेचयेत् ।
चर्म्मना गोफणावन्ध: कार्य्यो यो वा हितो भवेत् ॥

Suśruta Saṁhitā, IV. ii.

पादौ निरस्तसुप्तस्य जलेन प्रोच्य चाक्षिणी ।
प्रवेश्य तुन्नसेवन्या मुक्तौ सीवेत्तत: परं ॥
कार्य्यो गोफणिकावन्ध: कक्ष्यासावेश्य यत्नकं ॥

Ibid, IV. ii.

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14. Pañcāṅgī or a five-tailed bandage[1] :— it is intended for the parts above the clavicle, as in the dislocations of the lower jaw. Caraka[2] mentions a bandage called kavalikā, to be tied tightly after setting a fracture or reducing a dislocation. It is so-called from the medicinal paste which is applied to the affected parts, underneath the splints.

Dunglison mentions a bandage called Accipitar to be applied over the nose. It is so called from its likeness to the claws of a hawk. It resembles the pañcāṅgī bandage of the Hindus.

So the bandages are recommended to vary according to the different parts of the body ; and the surgeon, using his discretion, is to select the form of bandage suitable to the part. The bandages are recommended to be firmly secured to their place by three strings, applied upwards, downwards and obliquely. The knot is avoided over the seat of ulcer and tied on a side.

Suśruta says : "Bandages are applied with three degrees of tightness according to the seat of the abscess :— 1. A tight bandage causes uneasiness but not actual pain ; 2. A loose bandage is loose and relaxed ; 3. An even bandage is properly applied—neither tight nor loose. The tight bandage is to be applied to the buttocks, sides of the abdomen, axilla, groin, chest and head. The eyes and joints

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[1] हन्वस्थिनी समानीय हनुसन्धी विसंहते ।
खे दयित्वा स्थिते सम्यक् पञ्चाङ्गीं वितरेद्भिषक् ॥
Suśruta Saṁhitā, IV. iii.

[2] अस्थिभग्नं च्युतं सन्धिं संदधीत समं पुनः ।
समेन सममङ्गेन कृत्वान्येन विचक्षणः ॥
स्थिरैः कवलिकाबन्धैः कुशिकाभिश्च संस्थितम् ।
पट्टैः प्रभूत सर्पिष्कैर्वेष्टयीतादृढं सुखं ॥
Caraka Saṁhitā, VI. xiii.

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are loosely bandaged. The even bandage is for the extremities, face, ears, neck, penis, scrotum, back, sides, and abdomen."[1]

Suśruta next deals with the alterations in the mode of applying bandages according to the rules laid down. He also advises the surgeon to be guided by the dictates of his common sense. He directs us to practise bandaging on the various large and small limbs of a human figure made of cloth or clay.[2]

With regard to the mode of application of bandages, Hippocrates says:[3] "It should be done quickly, without pain, with ease and with elegance, ... it should fit well and neatly. The forms of it are the simple, the slightly winding (called ascia), the sloping (sima), the monoculus, the rhombus, and semi-rhombus".

The whole chapter of Suśruta is very interesting and will repay perusal. If bodily transferred, it will adorn any modern text book on surgery.

As it is very difficult to covey a correct idea of these bandages in words, I have given figures of them from modern works on surgery, from which their construction and uses will be readily understood at a glance.

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[1] तत्र व्रणायतनविशेषाद्बन्ध विशेषस्त्विविधो भवति गाढ: समः शिथिल इति।
पीड़यन्नरुजो गाढ: सोच्छ्वास: शिथिल: स्मृत:।
नैव गाढ़ो न शिथिल: समोबन्ध: प्रकीर्त्तित:।
तत्र स्फिक् कुचि कक्षावङ्क्षणोर: शिर: सुगाढ:। शाखावदन कर्णकण्ठमेढ्रमुष्कपृष्ठपार्श्वोदरेषु समः। अक्षोः सन्धिषु च शिथिल इति।

Suśruta Saṁhitā, I. xviii.

[2] पुत्तमय पुरुषाङ्ग प्रत्यङ्गविशेषेषु बन्धयोग्यं।

Ibid, I. ix.

[3] The Genuine Works of Hippocrates, Vol. II, P. 477. Syd. Soc. Ed.

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Abdominal Binder.

Caraka[1] mentions the use of abdominal binder for the recently delivered woman to prevent derangement of air by its expansion in her abdomen.

Dr. Barnes says:[2] "The sudden expulsion of one-tenth of the body-weight from the abdominal cavity is attended by a sudden removal of a force hitherto pressing upon the vessels and organs of the chest, abdomen, and pelvis. This entails in some cases a tendency to vacuum. Hence disturbance of the circulation. Now the binder, by supporting the abdominal walls, restores the equilibrium of pressure. The pressure exerted upon the uterus works as a gentle continuous stimulus to contraction. The woman is conscious of the support and is greateful for it. . . . . The figure, so precious, and rightly so, to women, is better preserved . . . . So applied, the binder becomes one of the most efficient agents in antiseptic midwifery; it keeps the walls of the uterus and vagina in contact, thus preventing the collection of fluids or clots, and shutting out air".

The use of cloth for other surgical purposes is also mentioned:—

Field hospital.

The cloth is to be used for the manufacture of tents for the doctors to live in. The wounded in war are to be treated in such tents. The tent of the surgeon-general should be close to that of the king in the battle-field.[3]

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[1] वेष्टयेदुदरं महता वाससा तथा तस्या न वायुरुदरे विकृतिमुत्पादयत्यनवकाशत्वात्।
Caraka Saṁhitā, IV. viii.

[2] Obstetirc Medicine and Surgery, Vol. II. p. 87.

[3] स्कन्धावारे च महति राजगेहादनन्तरं।
भवेत् सन्निहितो वैद्यः सर्वोपकरणान्वितः॥

Small tents are also recommended for applying vapour bath to patients.

Dressings.

Dṛḍhavala[1] mentions the use of medicated gauzes to be used as sponge by the females and says : "In discharges from the vagina, pieces of cloth soaked in decoction of barks of Vata (Ficus Bengalensis) and Lodha (Symplocos racemosa) and dried, should be put inside the canal."

In the Mohāvāgga[2] we find the use of itch-cloth :— "I allow, O Bhikkhus, to whomsoever has the itch, or boils, or a discharge, or scabs, the use of an itch-cloth".

"According to the 90th Pakittiya such cloth must not be more than four spans in length and two in breadth."

I can not help quoting from Mohāvāgga,[3] another discourse of Buddha as it shows clearly the surgical treatment of boils in ancient times :—

Now at that time a certain Bhikkhu had boils.

"I allow, O Bhikkhus, the use of the lancet".

Decoctions of astringent herbs were required.

"I allow, O Bhikkhus, decoctions of astringent herbs".

Sesamum salve was required.

तवस्थमेनं ध्वजवद्यशः ख्याति समुच्छ्रितं ।
उपसर्पन्त्यमोहेन विषशल्यामयर्द्धिताः ॥

Suśruta Saṁhitā, I. xxxiv.

[1] न्यग्रोधत्वक् कषायेण लोध्रकल्कं तथा पिबेत् ।
आस्रावे चौमपट्टं वा भावितं तेऽनुधारयेत् ॥

Caraka Saṁhitā, VI. xxx.

[2] Mahāvāgga. VIII. 17, 2.

[3] Ibid. VI. 14, 4 & 5.

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"I allow, O Bhikkhus, the use of sesamum salve".

5. Compresses were required.

"I allow, O Bhikkhus, the use of compresses."

It was necessary to tie up the sore with cloth.

"I allow, O Bhikkhus, the use of bandages for tieing up wounds".

The sore itched.

"I allow you, O Bhikkhus, the sprinkling of a sore with mustard-powder".

The sore became moist.

"I allow you, Bhikkhus, to fumigate (the sore)."

Proud flesh formed on the wound.

"I allow you, O Bhikkhus, to cut off (proud flesh) with a lancet".

The wound would not close up.

"I allow, O Bhikkhus, the use of oil for wounds".

The oil ran over.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of fine rags, and of all kinds of ways of treating wounds".

If the object of fumigating the sore was to sterilize it, as it certainly was, we may take this dialogue as the best sketch of the scientific treatment of boils,— remembering that it represents the knowledge of surgery more than 2500 years ago.

Cakrapāṇi advises us to tie the ends of the hairs of a patient, by a piece of cloth,[1] before performing phlebotomy on the vessels of the head and neck.

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[1] मृदुपट्टात्तकेशान्तो जानुस्थार्पितकर्परः।

Cakradatta, Śirobyadhādhikāra.

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4. Carma or Leather.

The use of leather in ancient medical practice in India was manifold.

Leather bandage.

Straps or belts of leather were used as bandages. Suśruta[1] advises us to apply the leather bandage in cases where more than half the thickness of the upper or lower extremities are cut by some sharp instruments in a slanting direction. Then the parts of the wound should be well adjusted, the bone and the soft parts kept in apposition, and the wound closed by sutures and well covered by dressings, over which the leather bandage is to be applied in the form of a gophaṇā or sling.

Leather bandage in the form of gophaṇā is mentioned by Suśruta[2] to be applied over the anus to prevent recurrence of procidentia of the rectum. The prolapsed bowl should be well bathed with ghee and fomented; and then reduced by gentle pressure. There should be a hole in the bandage just in front of the anus to allow flatus to pass out. Vṛnda[3] alludes to it. Similarly the modern surgeons use a pad supported by a bandage as an aid in

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[1] See foot-note 1, P. 178.

[2] गुदभ्रंशे गुदं खिन्नं स्नेहाभ्यक्तं प्रवेशयेत् ।
कारयेदगोफणाबन्धं मध्यच्छिद्रेण चर्म्मणा ॥
Suśruta Saṁhitā, IV. xx.

[3] गुदभ्रंशे गुदं स्नेहैरभ्यज्याऽथ प्रवेशयेत् ।
प्रविष्टं स्वेदयेच्चापि वङ्क्षं गोःफणया भृशम् ॥
गोःफणयेति । गोःफणा बन्धविशेषः ।
उक्तं हि:—उच्चारनिर्गमार्थं सच्छिद्रेण चर्मणा चास्य गोःफणाबन्धः कार्य्य इति ॥
Vṛndamādhava or Sidhhayoga, Ch. 57.

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preventing descent of the gut. It is mentioned also in the Cakradatta[1] and the Yogaratnākara.[2]

Dṛḍhavala mentions the use of a piece of untanned leather to be applied over a layer of ointment during the day, while during the night the leaf of Eraṇḍa (Ricinus communis) is directed to be used.[3]

Leather ligatures.

In the treatment of snake-bite, a ligature is advised to be used above the seat of injury to stop the circulation of poisoned blood. This ligature is advised to be made of leather, or braided fibres of trees, or soft cord of jute, etc.[4]

Yantra-śāṭaka. Lithotomy Strap or Binding Apparatus.

This is the name of the leather shackle, which is recommended to be used during the operation for stone in the bladder. The patient should flex his knees and elbows; and the parts are to be

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[1] गुदभंशे गुदं स्नेहैरभ्यज्याऽऽश्य प्रवेशयेत्।
प्रविष्टे स्वेदयेच्चापि वङ्गं गोःफणया दृढम्॥
Cakradatta, Kṣudraroga Cikitsā.

[2] गुदभंशे गुदं खिन्नं स्नेहेनाक्तं प्रवेशयेत्।
प्रविष्टं रोधयेदयबाद्रव्यसच्छिद्र चर्म्मना॥
Yogaratnākara, P. 343.

[3] एरण्डपर्वैः प्रच्छाद्य रात्रौ कल्यं विमोचयेत्॥
चौराम्बूषा ततः सिक्तं पुनर्यथोपनाहितम्।
मुञ्चेद्रात्रौ दिवावद्धं चर्म्मभिश्च सुलोमभिः॥ ९४।
Caraka Saṁhitā, VI. xxviii.

[4] सर्व्वैरेवादितः सर्पैः शाखादष्टस्य देहिनः।
दंशस्योपरि वध्नीयादरिष्टायतुराङ्गुलं॥
स्रोतचर्म्मान्त-वल्कानां मृदुनान्यतमेन च।
न गच्छति विषं देहमरिष्टाभिर्निवारितं॥
Suśruta Saṁhitā, V. v

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tied together by this instrument.[1] Similarly, it is to be used during the operation for piles; but then, according to Suśruta,[2] the neck and thighs are to be tied by the instrument which is to be held firmly by the assistants. Vāgbhaṭa[3] uses cloth instead of leather.

Yantra-śāṭaka is also to be used during the operation of phlebotomy. Suśruta says[4] : "If venesection is required to be done, the patient is to be seated on a stool, an aratni high (from the elbow to the end of the little finger), facing towards the sun. The thighs are to be flexed, the two elbows to be placed over the knees, and the hands (the fingers being clenched into fists) to be fixed on the two sides of the neck. The two ends of the shackle which pass over the fists, are held up at his back by the left hand of an assistant, who with his right hand steadily (neither forcibly nor loosely) presses above the part selected, to make the veins prominent, and at the same time rubs on the back to

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[1] सङ्कुचितजानुकपूरमितरेण सहाववद्धं सूत्रेण शाटकैर्व्वा ।

Suśruta Saṁhitā, IV. vii.

[2] वस्त्रकम्बलकोपविष्टं यन्त्रशाटकेन परिवित्त गीवासक्थंपरिकर्म्मिभिः सुपरिगृहीतमस्पन्दनशरीरं कृत्वा ।

Ibid, IV. vi.

[3] अथ यन्त्रेण वाससा ।

सक्थ्नोः शिरोधरायाश्च परिवित्त सजुस्थितम् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, IV. viii.

[4] तत्र व्यध्यसिरं पुरुषं प्रत्यादित्यसुखमरत्निमात्रोच्छ्रिते उपवेश्यासने सक्थ्नोराकुञ्चितयोर्निवेश्य कूर्परसन्धिद्वयस्योपरि हस्तावन्तर्मूढाङ्गुष्ठकृतमुष्टी सन्यसेत्: स्थापयित्वा यन्त्रणशाटकं गीवासक्थ्योरुपरि परिविन्यासेन पुरुषेण पश्चात्स्थितेन वामहस्तेनोत्तानेन शाटकान्तर्द्वयं गाहयित्वा ततो वैद्यो ब्रूयाद्विगृह्यतां विरोचनार्थं नायामवतिष्ठितं यन्त्रमावेष्टयेत्यसक्त्स्रावणार्थं यन्त्रं पृष्ठतश्चैव पीड्येति कर्म्मसुखञ्च वायुर्न्नुद्यं स्यादेवं उत्तमाङ्गगतानामन्तर्मुखवर्ज्यानां सिराणां व्यधेन यन्त्रणविधिः ।

Suśruta Saṁhitā, III. viii.

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stimulate bleeding, the patient being then told to inflate his mouth with air forcibly. This is the method of binding for puncturing the veins of the head except those (veins) which have their mouths turned inside the body". Vāgbhaṭa describes a similar procedure in bleediug from the vessels of the neck[1].

The Greeks also used ligatures to tie up the arms and legs of a patient in the lithotomy position. Paul[2] says: "In operating, the woman should be placed on a seat in a supine posture, having her legs drawn up to the belly, and her thighs seperated from one another. Let the arms likewise be brought down to her legs and secured by proper ligatures about the neck".

In modern times, similarly, we use lithotomy straps or crutch, after placing the patient in the lithotomy position during the operation of lithotomy and excision of piles.

Pāśa.

This is a different shackle to be used for binding insane persons.[3]

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[1] अग्रितापातपस्निग्धो जानूच्चासन संस्थितः ।
मृदुपट्टार्त्तकेशान्तो जानुस्थापित कूर्परः ॥
मुष्टिभ्यां वस्त्र गर्भाभ्यां मन्ये गाढं निपीड्येत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[2] Paul. VI. lxxiii.

[3] भीमाकारैर्नरैर्नागैर्दान्तैर्व्यालैश्च निर्व्विषैः ॥
भीषयेत् सततं पाशैः कशाभिर्व्वाथ ताड़येत् ।
यन्त्रयित्वा सुषुप्तं वा त्रासयेत्तं दृशाग्निना ।

Suśruta Saṁhitā, VI. lxxii.

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Abdominal Binder.

The use of cloth binder has been described before[1]. Leather binder is to be used after the operation of paracentesis abdominis to apply pressure over the abdomen. After draining the fluid of ascites, the abdomen of the patient should be well wrapped with blankets, or silk cloth, or leather binder, for then the abdomen would not be flatulently distended by air.[2]

Leather bags.

The use of leather in the formation of bags of the vasti-yantra has been described before[3].

Śīro-vasti. Leather bag for the head.

For application of oil on the head, Suśruta[4] directs us to use a goat's bladder filled with medicated oil, just in the same way as ice bags are used nowadays.

Śārṅgadhara[5] describes another variety of śīro-vasti: "It is

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[1] See P. 181.

[2] निःस्रुतेच दोषे गाढ़तरमाविक काशेय चर्म्मणामखतमेन परिवेष्टयेदुदरं तथा नाभ्मापयति वायुः ॥

Suśruta Saṁhitā, IV. xiv.

[3] See P. 129-30.

[4] ऋज्वासीनस्य वध्नीयाद वस्तिकोषं ततो दृढ़ं ।

Ibid, VI. xviii.

[5] शिरोवस्तिविधिश्चाच प्रोच्यते सुश्रसम्मतः ।
शिरोवस्तिश्चर्म्मणः स्यादिसुखो द्वादशाङ्गुलः ॥
शिरःप्रमाणं तं वद्वा मस्तके माषपिष्टकैः ।
सन्धिरोधस्विधायादौ स्नेहैः कोष्णैः प्रपूरयेत् ॥
तावत् धार्य्यस्तु यावत् स्यान्नासानेचसुखस्रुतिः ।
वेदनोपशमो वापि मात्राणां वा सहस्रकम् ॥

Śārṅgadhara Saṁgraha, III. xi.

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made of leather, has a length of twelve aṅguli and has two orifices or mouths. The leather bag is to be well tied round the head, the junction of the circumference of the bag and the skin should be well pasted with māṣa (Phaseolus Rox) glue. Then the cavity thus formed is to be filled with hot oily medicine. This is to be retained until the headache is relieved." Cakradatta[1] also mentions it. The bag is described to be sixteen aṅguli high in the Yogaratnākara[2]. Vāgbhaṭa[3] advises us to use leather of a cow or buffalo, and it is said to have been twelve aṅguli broad.

Leather band.

In phlebotomy, a band is advised to be applied above the spot where the vein is to be punctured. This band is recommended to be made of cloth, or jute, or leather, or barks of

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[1] आशिरो व्यायतं चर्म्म कृत्वाष्टाङ्गुलमुच्छ्रितम् ॥
तेनावेष्य शिरोऽधस्तान्माषकल्केन लेपयेत् ।
निश्चलस्योपविष्टस्य तैलैरुष्णैः प्रपूरयेत् ॥
Cakradatta, Śiro-roga Cikitsā.

[2] आशिरो वापितच्चर्म्म षोड़शाङ्गुलमुच्छ्रितम् ।
तेनावेष्य शिरोऽधस्तान्माषकल्केन लेपयेत् ॥
Yogaratnākara, P. 402.

[3] विधिस्तस्य निषण्णस्य पीठे जानुसमे स्थदौ ।
शुद्धात्तस्निग्नदेहस्य दिनान्ते गव्यमाहिषम् ॥
द्वादशाङ्गुलविस्तीर्णं चर्म्मपट्टं शिरः समम् ।
आकर्ण बन्धन स्थानं ललाटे वस्त्र वेष्टिते ।
चैलवेणिकया बद्धा माषकल्केन लेपयेत् ॥
ततो यथाव्याधि: श्रृतं स्नेहं कोष्णं निषेचयेत् ।
ऊर्द्धं केशभुवो यावद्वाङ्गुलं धारयेच्च तम् ॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxii.

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trees, or tendrils of twining plants[1]; and it should not be applied either too tight or too loose. As for example, in phlebotomy in the foot, the yantra-śāṭaka or ligature should be applied below the knee-joint, while the band is to be tied round, at a distance of four aṅguli above the part selected for the operation.[2] Vāgbhaṭa[3] says: "In phlebotomy, a band is to be tied round the upper extremity, four aṅguli above the spot selected for opening the vein which is to be made prominent by pressing it upwards with the closed fist." Cakradatta[4] also quotes it. Vāgbhaṭa[5] recommends us to use a cloth band to be tied round the leg, four aṅguli above the spot selected for opening the vein in the leg.

This band corresponds to the band of Antyllus used by the Greeks. Antyllus applies a ligature of two fingers'

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[1] गाढं वद्धोपरि दृढं रज्ज्वा पट्टेन वा समम्।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

वस्त्रपट्टचर्म्मान्तर्व्वल्कललतानामन्यतमेन यन्त्रयित्वा नातिगाढं नातिशिथिलं शरीरं प्रदेशमासाद्य यथोक्तं शस्त्रं गृहीत्वा सिरां विध्येत्॥

Suśruta Saṁhitā, III. viii.

[2] तत्र पादव्यधसिरस्य पादं समेस्थाने सुस्थिरं स्थापयित्वान्यं पादमीषत्सङ्कुचितमुच्चैः कृत्वा व्यध्यपादं जानुसन्धेरधः शाटकेनावेष्य हस्ताभ्यां प्रपीड्य गुल्फं व्यध्यप्रदेशस्योपरि चतुरङ्गुलम् स्रोतदौनामन्यतमेन वद्ध्वा पादासिरां विध्येत्॥

Ibid.

[3] विध्येद्बद्धशिरां बाह्वावनाकुञ्चित कूर्परे।
वद्धा सुखोपविष्टस्य मुष्टिमङ्गुष्ठ गर्भिणीम्।
ऊर्द्धं वेध्यप्रदेशाच्च वद्धिकां चतुरङ्गुले॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[4] Cakradatta, Śīra-vyādhādhikāra.

[5] पादे तु सुस्थितेऽधस्ताज्जानु सन्धेर्निपीड़िते।
गाढं कराभ्यामागुल्फं चरणे तस्य चोपरि॥
द्वितीये कुञ्चिते किञ्चिदारूढे हस्तवत्ततः।
वद्धा विध्येत् सिरामित्यमनुक्तेष्वपि कल्पयेत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

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breadth round the arm in bleeding at the elbow, while to bleed at the ankle, the band is to be applied at the knee. It is mentioned as fillet in the pseudo-Hippocratic treatise on Ulcers;[1] and Oribasius[2] gives an interesting dissertation on the subject, principally condensed from the works of Herodotus, Antyllus and Galen. Paul[3] also ties a narrow band round some muscular part of the arm before abstracting blood from the inner part of the elbow. "Wherefore we must tie a narrow band around some muscular part of the arm, and having by friction of the hands upon one another produced the necessary fulness of the vein, we divide it transversely, but only along its breadth."

Leather bottles, jars, maṣaka, etc.

Leather was used in the manufacture of bottles and jars. Leather maṣaka for honey, Soma juice, and dadhi (curdled milk), is mentioned in the Ṛgveda[4] and also in the Laws of Manu where

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[1] Ulcers, iii. 328.

[2] Med. Collect., vii, Phlebotomy.

[3] Paulus Ægineta, Adam's Trans, Bk. VI. Sec. XL.

[4] इतेरिव तेऽहकमस्तु सख्यं ।
अच्छिद्रस्य दधन्वतः सुपूर्णस्य दधन्वतः ॥
Ṛgveda, 6 M. 48 S. 4 A. 8 Ch. 18 v.

यो ह वां मधुनो इतिराश्वितो रथचर्षणे ।
ततः पिबतमश्विना ॥
Ibid, 8 M. 5 S. 5 A. 8 Ch. 19 v.

उच्छिष्टं चम्वोर्भर सोमं पवित्र आ सृज ।
नि धेहि गोरधि त्वचि ॥
Ibid, 1 M. 28 S. 1 A. 2 Ch. 9 v.

एष सोमो अधि त्वचि गवां क्रीळत्यद्रिभिः ।
इन्द्रं मदाय जोहुवत् ॥
Ibid, 9 M. 66 S. 7 A. 2 Ch. 29 v.

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it is called drti[1]. Leather maṣaka or inflated skins were in use as swimming bladders, and we have a representation of "figures with garlands in their hands, swimming and disporting themselves, supported on maṣaks or inflated skins."[2] In the Ṛgveda, Agastya in his spell to neutralise poison, says:[3] "I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits."[4] Dr. Mitra points out that "other smṛtis ordain that oleaginous articles preserved in leather bottles do not become impure by the contact of the impure cowhide; and in the present day, jars of that material are in extensive use in Bengal and the North-West Provinces for the storage of oil and ghee. In the latter place, leather bags are universally used for raising water from wells, and

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रुवति भीमो वृषभस्तविष्यया गृह्वे शिशानो हरिणी विचक्षणः।
आ योनिं सोमः सुकृतं नि षीदति गव्ययी त्वग्भवति निर्णिगव्ययी॥

Ṛgveda, 9 M. 70 S. 7 A. 2 Ch. 7 v.

एष स्य भानुरुदियर्ति युज्यते रथः परिज्मा दिवो अस्य सानवि।
पृचासो बिन्दुमिन्दुना अधि त्रयो दृतिस्तुरीयो मधुनो वि रप्शते॥

Ibid, 4 M. 45 S. 3 A. 7 Ch. 1 v.

See Wilson's Ṛgveda, II. 28.

[1] इन्द्रियाणां तु सर्वेषां यद्येकं क्षरतीन्द्रियम्।
ततोऽस्य क्षरति प्रज्ञा दृतेः पादादिवोदकम्॥

Manu Saṁhitā, II. 99.

"But when one among all his organs fails, by that single failure his knowledge of God passes away, as water flows through one hole in a leathern bottle."

Ibid, Jones' Translation.

[2] Pl. xxxi. fig. 1. Fergusson's Tree and Serpent Worship, P. 127.

[3] सूर्ये विषमा सजामि दृतिं सुरावतो गृहे।

Ṛgveda, 1 M. 191 S. 2 A. 5 Ch. 10 v.

[4] Ibid. Wilson's Translation.

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according to the law books of Śaṅkha and Likhita,[1] that water is declared pure which is kept in old leather bottles"[2]. To this may be contrasted the prevailing Hindu notion that water is defiled if touched by a Brāhmana in his shoes. Though the leather is not allowed to be a material of dress of the Hindus, except his shoes which are considered as unclean, leather belts formed one of the eight sacred utensils necessary for a śramaṇa of the Buddhist order; and in the Manu Saṁhitā[3] we find the students of theology advised to "wear for their mantles, the hides of black antelopes, of common deer, or of goats."[4]

5. ANTARVALKALA. THE INNER BARKS OF TREES.

Barks of trees are recommended to be used as splints for the support of fractured bones. In fractures of bones of the foot, leg and thigh, Suśruta directs us to use splints made of barks of trees[5] to surround the limbs. In the treatment of a simple fracture, Bhāva Miśra advises us to use cold water first, then mud is to be applied, and lastly the fractured bones should be secured

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[1] आपो रूपवदगन्धवत्यः परिशुद्धा जीर्णचर्म्मकरण्डकेवभ्युद्धृताः।
चर्म्मकरण्डः चर्म्मपुटः।

Śaṅkha and Likhita.

[2] Dr. R. C. Mitra's Indo-Aryans. vol. II.

[3] कार्ष्णरौरववास्तानि चर्माणि ब्रह्मचारिणः।
वसीरन्नानुपूर्व्वेण शाणक्षौमाविकानि च॥

Manu Saṁhitā, II. 41.

[4] Ibid. Sir Wm. Jones' Translation. II. 41.

[5] अभ्यज्य सर्पिषापादं तलभग्नं कुशोत्तरं।
वस्त्रपट्टेन वध्नीयान्नच व्यायाममाचरेत्॥

Suśruta Saṁhitā, IV. iii.

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by splints and bandages.[1] In the Yogaratnākara[2], we are advised to treat fractures, by lowering the raised end and elevating the depressed end of the bone, and then by using splints and bandages to keep them in position. Bhāva Miśra[3] describes it similarly after Suśruta. Suśruta directs us to use barks of Vata (Ficus Indica. Rox.) and bamboo strips as splints to support the neck after reducing its dislocation by holding at the temporo-maxillary articulations on the sides and the occipital protuberance on the back, and raising him up in the air. He should lie down with his head raised for seven days[4]. In modern times, the Sayre's suspension apparatus and jury mast serve the same purpose.

The barks of Madhuka (Bassia latifolia), Aśvattha (Ficus religiosus), Kukubha (Terminalia arjuna), Polāśa (Butea frondosa, Rox.), Udumbara (Ficus glomerata, Rox.) bamboo, śāla (Shorea robusta), Vata (Ficus Indica. Rox.) are mentioned as

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[1] आदौ भग्नं विदित्वा तु सेचयेच्छीतलाम्बुना।
पङ्क्तनालेपनङ्कार्य्यं बन्धनञ्च कुशान्वितम् ॥
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[2] पङ्क्तेनालेपनं कुर्य्याद्बन्धनं च कुशान्वितम्।
अवनामितमुन्नाम्योदुन्नतं चावपीड़येत् ॥
चिन्नं द्विधापि च स्थाने संस्थाप्य विधिमाचरेत् ॥
Yogaratnākara, P. 345.

[3] अवनामितमुन्नम्य दुन्नतञ्चावपीड़येत्।
आञ्छेदतिचिन्नमधोगतञ्चोपरि वर्त्तयेत् ॥
Suśruta Saṁhitā, IV. iii.
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[4] अवटावथहन्वोश्च प्रसक्तोन्नमयेन्नरं।
तथा कुशान् समंदत्त्वा वस्त्रपट्टैन वेष्टयेत्।
उत्तानं शाययेच्चैनं सप्तरात्रमतन्द्रितः ॥
Suśrutā Saṁhitā, IV. iii.

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supplying the materials of splints[1]. Bhāva Miśra[2] adds Kadamba (Anthocephalus cadamba), Hijjala (Barringtonia acutangula), Sarjja (Pinus longifolia) to the list. Such splints are called kuśa, and Vāgbhaṭa[3] says that the splints should be broad, thin, pliant and clean.

Dr. Jacobi, of Dublin, says that he has seen an excellent splint made from the "fresh bark of a tree, taken off while the sap is rising". "It fits admirably", says he, "just like paste-board soaked in water"[4]. Dr. C. C. Jewet[5] recommends for the same purpose the bark of leriodendron, or tulip tree.

The Crutches.

The crutches were used to help the crippled. In the Vajasenīya Saṁhitā of the White Yayurveda, there is a passage describing the different kinds of human victims, appropriated to particular gods and godesses. The passage occurs also in the Taittirīya Brāhmaṇa with slight differences. There we

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[1] मधूकोडुम्बराश्वत्थ पलाश ककुभत्वच:।
वंशसर्ज्ज वटानां वा कुशार्थमुपसंहरेत् ॥
Suśruta Saṁhitā, IV. iii.

[2] मधुकोदुम्बराश्वत्थ कदम्ब निचुलत्वच:।
वंशसर्ज्जार्জ্জুनानाच्च कुशार्थमुपसंहरेत् ॥
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[3] कदम्बोदुम्बराश्वत्थसर्ज्जार्জ্জুन पलाशजै:।
वंशोद्भवै वा पृथुभि स्तनुभि: सुनिवेशितै:॥
सुश्लक्ष्णै: सुप्रतिस्तम्भै वैल्कलै: शकलैरपि।
कुशाद्यै: समं बन्धं पट्टस्योपरि योजयेत्॥
Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxvii.

[4] Hamilton's Fractures and Dislocations. 5th Ed. P. 50-51.

[5] The 20th Mass. vols.

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find "to the two (deities) who preside over the gains above or below one's expectation (utkula and vikula), a cripple, who can not move even with the help of a crutch" is recommended to be sacrificed. And again "to the divinity of land, a cripple who moves about on a crutch."[1]

The use of the sound limb as a splint of support for the fractured bone of the opposite side was well known. Wooden splints resembling in shape the injured member are also recommended. Suśruta says[2] that if the hand be fractured, it is to be tied with the opposite hand, but in fractures of both the hands, Gayadāssa[3] recommends a wooden hand to be used as a splint for both. After union of the fractured bones, the hands should be made to hold balls of cow-dung, mud and stones.

6. Latā or creepers (tendrils of).

The tendrils of creepers as materials of ligature are mentioned

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[1] उत्कुलविकुलाभ्यां (उत्कुलविकुलेभ्यः) विस्थिनं।
भूम्ये पीठसर्पिनमालभते।

Taittirīya Brāhmaṇa.

Quoted in Mitra's Indo-Aryans. vol. II. P. 84—85.

[2] उभे तले समे कृत्वा तलभग्नस्य देहिनः।
वह्नीयादामतैलेन परिषेकञ्च कारयेत्।
प्राग् गोमयमयं पिण्डं धारयेन् मृन्मयं ततः।
हस्ते जातबलेचापि कुर्य्यात् पाणे ॥

Suśruta Saṁhitā, IV. iii.

[3] गयोतु उभेऽपि हस्ततले तवैकस्य भङ्गे वामं दक्षिणेन दक्षिणं वामेन, उभयोस्तुभङ्गेन तत्समेन, काष्ठमयेन कृत्वा ह्येऽपि वह्नीयादेवं दार्ढ्यः भवतीति, मृत्पिण्डादिधारणसामर्थ्यप्राप्त्यर्थम्।

Quoted in Dallana's Commentary, IV. iii.

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by Suśruta. He recommends[1] to give up a patient, bit by a snake, as hopeless when he does not respond to the application of stimuli, such as cold water, tendrils of creepers, etc. Vāgbhaṭa[2] advises us to introduce the stalk of the lotus, with a thread tied to it, inside the throat to extract any foreign body stuck there. When the soft stalk is touched by the śalya, it should be extracted by the sudden withdrawal of the stalk and thread.

7. Vastra or cloth.

Cloth[3] as a material of bandages, tents, gauze, etc. has been described before[4].

8. Aṣṭhīlaśma. Stone or pebble.

It is a piece of stone—long and round. It is advised to be used for moving arrows fixed in the bone[5]. Caraka[6] advises us to strike two pieces of stone against each other to resuscitate a

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[1] अजीर्णे पित्तातप पीड़ितेषु वालप्रमेहेष्वथ गर्भिनीषु ।
वृद्धातुर क्षीणवुभुक्षितेषु रूक्षेषु भीरुष्वथ दुर्द्दिनेषु ॥
शस्त्रक्षते यस्य न रक्तमस्ति राज्योलताभिश्च न सम्भवन्ति ।
शीताभिराद्भिश्च न रोम हर्षो विषाभिभूतं परिवर्ज्जयेतं ॥

Suśruta Saṁhitā, V. iii.

[2] कण्ठस्रोतोगते शल्य सूत्र कण्ठे प्रवेशयेत् ।
विसेनात्ते ततः शल्यं विसं सूत्रं समं हरेत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] वस्त्रं प्रसिद्ध तूलक सूत्रनिर्म्मितं वेष्टनार्थं प्रयुज्यते ॥

Vāgbhatārtha Kaumudī, I. xxv.

[4] See P. 176-83.

[5] अश्मप्रस्तरखण्डं शस्त्रपीड़नार्थं निर्घातनाच्च युज्यते ॥

Ibid.

[6] अश्मनोः संघट्टनं कर्णयोर्मुले शीतोदकेनोष्णोदकेन वा सुखपरिषेकः ।

Caraka Saṁhitā, IV. viii.

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still-born child. In bleeding from the veins of the neck, Vāgbhaṭa[1] advises the patient to hold firmly two pieces of stones in their hands.

A piece of stone is to be used by a person, for holding it with his hand, after recovery from fractures of the carpal and metatarsal bones[2].

In ancient times, in India, the kings used to decorate themselves with antidotary gems, as a safeguard against poisons.[3] Even now the snake charmers apply a black stone on their bodies where they are wounded by the venomous reptile. This stone is popularly known as the vi-a-pāthara or poison-stone, and is supposed to have the property of extracting poison from the body.

9. Mudgara. Hammer.

Suśruta directs us to use a hammer or a piece of stone to strike an arrow firmly fixed in the bone, until loosened, when it can be conveniently extracted by means of a pair of forceps[4]. It should be pointed out that the tubular instrument—śalya

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[1] पाषाणगर्भहस्तस्य जानुस्थे प्रसृते भुजे।
कुचेरारभ्य सदिते विध्येदङ्गोर्ईपट्टके॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[2] See foot-note. 2. P. 196.

[3] विषघ्नैरुदके स्नातो विषघ्नमणिभूषितः।
परीचितं समन्त्रीयाग्गाङ्गुलाविङ्गिषग्व्रतः॥

Kāmandakīya Nītisāra, Ch. vii. v. 10.

रचितो गरुडोद्गार मणिर्यस्य विभूषणं।
स्थावरं जङ्गमं तस्य विषं निर्व्विषितां व्रजेत्॥

[4] अस्थिदेशोत्तुष्टित मष्ठीलाग्रमुद्गराणामन्यतमस्य प्रहारेण विचाल्य यथामार्गमेव।

Suśrutā Saṁhitā, I. xxvii.

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nirghātanī—described before[1], served the same purpose. Vāgbhaṭa also uses a hammer[2] to shake an arrow fixed in the bone, and directs us to extract it with the hands or by the various kinds of forceps[3].

The Greeks used some iron instrument to shake such an arrow from the place where it was lodged. The hammer was also used by the Greeks and Romans but in a different capacity. Paul mentions its use in cranial surgery to strike the lenticular and gouge[4]. Paul and Celsus describe a "method of extracting foreign bodies from the ear by laying the patient on a board and striking the under side with a mallet."[5] Vāgbhaṭa describes this method for draining out water from the ear.[6]

10. Pānipādatala. The palm of hand and sole of foot.

11. Aṅguli or Fingers.

The surgeon's hand is considered by Suśruta to be the principal instrument as the use of all other instruments depends

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[1] See P. 111.

[2] सुद्धराहृतया नाड्या निर्घात्योत्तुण्डितं हरेत् ।
तैरेव चानयेन्मार्गमार्गोत्तुण्डितं तु यत् ॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] अथाहरेत् करप्राप्यं करणैरितरत् पुनः ।
दृश्यं सिंहाहिमकरवक्त्रैः कर्कटकाननैः ॥
अदृश्यं व्रणसंस्थानाद् ग्रहीतुं शक्यते यतः ।
कङ्क बङ्गाङ्ग कुरर शरारी वायसाननैः ॥
Ibid.

[4] Paulus Ægineta VII. xc.

[5] Milne, Graeco-Roman Surgical Instruments, p. 125.

[6] कर्णेऽम्बु पूर्णं हस्तेन मथित्वा तैलवारिणी ।
चिपेदधोमुखं कर्णं हन्याद्वा चूषयेत वा ॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

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upon it[1]. But again he mentions the hand and foot as accessory to, or substitutes for, the instruments. Longmore[2] says: "Of all instruments for making a complete examination of a gun-shot wound as well as for exploring for foreign bodies which may be lodged in it, the finger of the surgeon is the most appropriate, whenever a wound is large enough to admit of its insertion." There are many instances of the use of hand and foot in the treatment of surgical diseases but I shall point out a few of them.

1. Both Suśruta[3] and Cakradatta[4] say that "if a swelling be hard but slightly painful, then it should be well fomented, pressed and rubbed by a piece of bamboo, or palm of the hand, or thumb to cause its subsidence. Bhāva Miśra also quotes this verse [5]. Suśruta [6] and Vāgbhaṭa [7] recommend a similar treatment for enlarged glands.

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[1] See foot note, P. 90.

[2] Longmore, Gun-shot Injuries, 1877, P. 319.

[3] अभ्यज्य स्वेदयित्वा तु वेणुना वा शनैः शनैः।
विमर्दयेद्भिषक् प्राज्ञस्तलेनाङ्गुष्ठकेन वा॥
Suśruta Saṁhitā, IV. i.

[4] अभ्यज्य स्वेदयित्वा च वेणुनाद्याततः शनैः।
विस्रापनार्थं स्रंसीयात् तलेनाङ्गुष्ठकेन वा॥
Cakradatta, Vraṇaśotha Cikitsā.

[5] अभ्यज्य स्वेदयित्वातु वेणुनाद्या शनैः शनैः।
विमर्दयेद्भिषङ्मन्दन्तलेनाङ्गुष्ठकेन वा॥
Bhāva Prakāśa, II. iii.

[6] हतेषु दोषेषु यथानुपूर्व्वं यत्नी भिषक् श्लेष्म समुत्थितेतु।
सिग्रस्य विस्रापनमेव कुर्य्यादङ्गुष्ठलोहोपलवेणु दण्डैः॥
Suśruta Saṁhitā, IV. xviii.

[7] संस्वेद्य बहुशोग्रन्थिं विस्रंसीयात् पुनः पुनः।
Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxx.

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2. Suśruta says[1] that "when a morsel of food sticks in the throat, a blow should be fearlessly struck with the fist on the shoulder of the patient without his knowledge". Vāgbhaṭa[2] also describes it.

It is however curious to find that exactly the same procedure was adopted by Alsaharavius. Adams in his commentary[3] on Paul says that "when a morsel of food sticks to the œsophagus, Alsaharavius directs that the person should be struck on the back, which will facilitate the descent of it".

3. In the reduction of dislocation of the lower jaw, Caraka used his fingers to do it exactly in the same way as recommended by the modern surgeons. He directs us to depress the lower jaw by the thumbs and at the same time to raise the chin by the index fingers[4]. The verses are quoted by Cakradatta.[5] The description of the method, quoted from any modern text book, would be a good commentary on the above passage of Caraka. Erichsen says[6]: "The reduction is best effected, by the surgeon,

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[1] गासशल्येतु कण्ठासक्ते निःशङ्कमनवुद्धस्कन्धे मुष्टिनाभिहन्यात् खेहं मद्यं पानीयम् वा पाययेत्।

Suśruta Samhitā, I. xxvii.

[2] अपान स्कन्धघाताभ्यां गासशल्ये प्रवेशयेत्।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] Adam's Commentary on Paulus Ægineta, VI. xxxii.

[4] व्यात्ताननं हनु खिनमङ्गुष्ठाभ्यां प्रपीड्य च।
प्रदेशिनीभ्याञ्चोन्नम्य चिबुकोन्नमनं हितं॥
स्रस्तां सङ्गमयेत् स्थानं स्रब्धां खिन्नं विनामयेत्।
प्रत्येकं स्थानदृष्ट्यादिक्रिया वैशेष्यमाचरेत्॥

Caraka Saṁhitā, VI. xxviii.

[5] Cakradatta, Vātabyādhi Cikitsā.

[6] Surgery, Vol. II, p. 658.

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standing before the patient, placing his thumbs, well protected by napkins, or a few turns of a narrow bandage, on the molar teeth on each side, and then depressing the angles of the jaw forcibly, at the same time that he raises the chin by means of his fingers spread out and placed underneath it."

4. Caraka says[1] : "After pairing her nails and covering the tip of her index finger with cotton, the nurse is to clean the palate, lips and throat of the new-born child".

With this passage we may compare what Barnes says on the point[2]. "The attendant having then placed the child close to the mother, so as to avoid any strain on the cord, should cleanse its mouth from any fluids, such as blood and mucus, it may have partially swallowed during its passage through the vagina. This should be done at once, as such fluids drawn into the lung vescicles may give rise to inflammation of the lungs, or even septicæmia."

5. Suśruta[3] recognises "six modes of diagonosing diseases, namely by the five senses *i.e.* by hearing, smell, taste, sight and touch, and by questions. "Symptoms descernible by the sense of touch are coolness or heat, smoothess or roughness, softness or hardness, and other tangible qualities of the skin in fever, dropsy,

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[1] अथास्य तालोष्ठकण्ठजिह्वाप्रमार्ज्जनमारभेत अङ्गुल्यासुपरिलिखितनखया सुप्रक्षालितोपधानकार्पासपिचुमत्या प्रथमं प्रमार्ज्जि तस्यास्य च शिरस्तालु कार्पासपिचुना स्नेहगर्भेन प्रतिच्छादयेत्।

Caraka Saṁhitā, IV. viii.

[2] Obstetric Medicine and Surgery, Vol. II, p. 105.

[3] षड्विधो हि रोगाणां विज्ञानोपायः। तद्यथा पञ्चभि श्रोत्रादिभिः प्रश्नेन चेति। * * * * स्पर्शनेन्द्रियविज्ञेयाः शीतोष्णश्च कर्कशमृदुकठिनत्वादयो ज्वरशोफादिषु।

Suśrutā Saṁhitā. I. x.

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and other diseases." And we know how important it is to educate the tactile sense in the diagonosis of diseases.

6. The foot is recommended to fix a part of the human body whence any foreign body may be removed easily by the hands.[1] Suśruta says[2]: "If a foreign body cannot be easily extracted, as when it is impacted in the hollow or the substance of a bone, the part should be pressed by the feet, and it should by drawn out by the instrument." Vāgbhaṭa also gives a similar description[3]. Caraka describes a method of removal of the placenta if not spontaneously seperated. One of the female attendants should press upon the navel of the peurpera forcibly with her right hand, while with the left hand placed upon her back, she should shake her. Then the heel is to be placed on the patient's buttock while the two sides of the gluteal regions are also to be pressed and shaken[4].

12. Jihvā or tongue.

The organ of taste as a means of diagonosis is noted by

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[1] पाद इति पादेन शरीरदेशं धृत्वा हस्तादियन्त्रेण उद्धरणादि क्रियते।

Vāgbhaṭārtha Kaumudī, I. xxv.

[2] अस्थिविवरप्रविष्टं अस्थिविदष्टं वाऽवगृह्य पादाभ्यां यन्त्रेणापहरेत्।

Suśruta Saṁhitā, I. xxvii.

[3] अस्थिदष्टे नरं पद्भ्यां पीड़यित्वा विनिर्हरेत्।
इत्यशक्ये सुवलिभिः सुगृहीतस्य किङ्करैः॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[4] तस्याश्चैदमरा न प्रपन्ना स्यादथैनामन्यतमा स्त्री दक्षिणेन पाणिना नाभेरुपरिहास्तलवत् निपीड्य सव्येन पाणिना पृष्ठत उपसंगृह्य सुनिर्हृतं निर्हृनुयात्। अथास्याः पादपार्ष्ण्यो-श्रोणीमाकोटयेदस्याः स्फिचावुपसंगृह्य सुपीड़ितं पीड़येत्।

Caraka Saṁhitā, V. .

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Suśruta[1]. "Symptoms discernible by the sense of taste are the various tastes noticeable in morbid secretions of urine and other diseases". Cakrapāṇi "explains that 'inference' is necessary, because the sense of taste can not be exercised by the physician on the patient directly;"[2] he must do it through some intermediate agents such as ants, whose attraction to sugar is well-known and so the presence of sugar in urinary diseases can be inferred."

13. Danta or tooth.

Ivory as a material of surgical instruments has been described bofore[3]. Suśruta[4] advises us to use the ash of ivory with stibium as a stimulant to the growth of hair on a scar. It is also recommended by Vāgbhaṭa[5].

14. Nakha or nails.

Suśruta advises the surgeon to use his nails[6] for the operation of cutting, piercing and extraction, if these can be possibly helped by his nails.

In modern times, nails often help the surgeons in separating

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[1] रसनेन्द्रियविज्ञेया: प्रमेहादिषु रसविशेषा: ।

Aṣṭāṅga Hṛdaya Saṁhitā, I. x.

[2] Hœrnle's Commentary on the Suśruta Saṁhitā, I. x. (Bibliotheca Indica).

[3] See page 67.

[4] हस्तीदन्तमसीं कृत्वा मुख्यश्चैव रसाञ्जनं ।
रोमाण्येतेन जायन्ते लीपान् पानितलेष्वपि ॥

Suśruta Saṁhitā, IV. i.

[5] तैलाक्ता हस्तिदन्तस्य मषी वा चौषधं परम् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxiv.

[6] आहार्य्यच्छेद्यभेद्येषु नखं शक्येषु योजयेत् ।

Suśruta Saṁhitā, I. viii.

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layers of tissues during operation as in the operation for the radical cure of hydrocele. We often extract thorns, impacted in our body, with our nails.

15. Mukha or mouth.

The use of mouth as a suction apparatus was well known to the ancients. Suśruta advises us to use ārā or pāṇimantha (awl) to perforate bone in diseases of the medullary canal, caused by obstructed and deranged air. He next introduces one end of a tube, open at both ends, into the canal through the perforation in the bone, while through the other end the surgeon sucks out air by his mouth[1]. The use of mouth for sucking out air through the śṛṅga or horn has been described before[2]. Caraka says[3] that the poison of a snake-bite may be sucked out by the surgeon's mouth, filled with flour or ash. Even in modern times, it is common amongst Indians to suck out blood, in accidental cuts by knives, by the mouth. The practice of the suckers in Europe has been noted before[4].

16. Vāla or hair.

Horse-hair is to be used for applying ligatures round the piles[5]. It is also a material of suture for the skin. Horse-hair is also described to have been used for raising pterygium. Paul[6] also used horse-hair to raise a pterygium.

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[1] निरुद्धेऽस्थनि वा वायौ पाणिमन्थेन दारिते।
नाड़ीं दत्त्वास्थनि भिषक् चूषयेत् पवनं बली॥
Suśruta Saṁhitā, IV. iv.

[2] See P. 148-49.

[3] दंशं वा चूषेन्मूखेन यवचूर्णपांशुपूर्णेन।
Caraka Saṁhitā, VI. xxv.

[4] See P. 149-50.

[5] वालाः, अश्वादीनां पुच्छभवकेशा नृकेशाश्च अर्शो वाल्यादि बन्धनार्थं युज्यते।
Vāgbhaṭārtha Kaumudī, I. xxv.

[6] Paulus Ægineta, VI. xviii.

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Suśruta[1] says: "Bundles of hairs or tents are to be used in the treatment of wounds in the skull, formed by the extraction of an arrow from the brain. These would prevent the hernial protrusion of the cerebral subtances from passing out through the wound. The hairs are to be removed one by one, as the wound heals up gradually." Vāgbhaṭa[2] also approves this treatment.

A bundle of hairs tied to a long thread is mentioned by Suśruta to have been used for the extraction of fish-bones from the throat[3]. The patient is directed to swallow the ball of hairs with some liquid. Next emetics are to be administered to excite vomiting. During this act, the foreign body gets entangled in the meshes of the ball, which being then suddenly pulled out by the thread outside, extracts the fish-bone satisfactorily. Vāgbhaṭa[4] also describes it similarly. For this purpose

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[1] शिरसोऽपहृते शल्ये वालवर्त्तिं प्रवेशयेत्।
वालवर्त्त्यामदत्तायां मस्तुलुङ्गः व्रणात् स्रवेत्॥

Suśruta Saṁhitā, IV. ii.

[2] कार्य्या शल्याहृते विद्धे भङ्गाद्विदलिते क्रिया।
शिरसोपहृते शल्ये वालवर्त्तिं प्रवेशयेत्॥
मस्तुलुङ्गस्रुते क्लुप्तो हन्यादेनं चलोऽन्यथा।
व्रणे रोहति चैकैकं शनैरपनयेत् कचम्।
मस्तुलुङ्गस्रुतौ खादेन्मत्स्यास्कानन्यजीवजान्॥

Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxvi.

[3] अस्थिशल्यमन्यद्वा तिर्य्यक्कण्ठासक्तमवेक्ष्य केशोण्डुकं दृढैकसूत्रवद्धं द्रवभक्तोपहितं पाययेदाकण्ठाच्च पूर्णकोष्ठं वामयेद्वमतश्च शल्यैकदेशसक्तं ज्ञात्वा सूत्रं सहसा त्वाचिपेत्।

Suśruta Saṁhitā, I. xxvii.

[4] केशोण्डुकेन पीतेन द्रवैः कण्टकमाचिपेत्।
सहसा सूत्रवद्धेन वमतस्तेन चेतरत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

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a tooth brush formed by chewing the end of a narrow branch of a tree is also recommended[1]. A common domestic remedy is to make the patients swallow large morsels of boiled rice, plantain, etc.

Paul[2] mentions a similar contrivance, and says: "Some are of opinion that the patient ought to be made to swallow large morsels, such as stalk of lettuces or pieces of bread; but others direct us to bind a thread about a small piece of clean soft sponge and give it to the patient to swallow, and then taking hold of the thread to draw it up, and to do this frequently in order that the thorn may get fixed in the sponge and be brought up". For this purpose Aetius used the epilation forceps. Paul calls it acanthobolus or the fish-bone forceps.

The modern surgeons use a probang for the same object. "Small sharp bodies, such as bristles, fish-bones, or pins, are generally found sticking between the pillars of the fauces and the tonsils." Such bodies "should not be pushed on, but an endeavour should be made to catch them with the "horse-hair probang." This being pushed gently, unexpanded, beyond the point where the pin or bone is stuck, is expanded by pulling up the handle and then withdrawn with a slight rotatory motion."[3]

Caraka[4] mentions the practice amongst the recently delivered

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[1] मृदुना वा दन्तधावनकुर्च्चकेनापहरेत्।

Suśruta Saṁhitā, I. xxvii.

[2] Paulus Ægineta, VI. xxxi.

[3] Swain's Surgical Emergencies, 3rd ed., Pp. 32-33.

[4] अथास्या वालवेण्या कण्ठतालु परिमृशेत्।

Caraka Saṁhitā, IV. xviii.

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women to push a braid of her hair into her throat, to help the expulsion of the placenta. So in the Yogaratnākara[1], her throat is advised to be rubbed by a finger surrounded by hairs. This practice is still prevalent among the women of Bengal to a certain extent.

Suture Material.

Horse-hair was the material used by the Hindus for sutures. Besides it, they used[2] sutures of fine thread, or the fibres of the bark of Aśmantaka (Cæsalpina digynia), or threads made of hemp or flax, or of the fibres of which bow-strings were made, or of the fibres of the Mūrvvā (Sansevieria zeylanica) or Guḍūcī (Tinspora cordifolia). Besides these, the Hindu surgeons used the mouth parts of the ants as clasps to close incisions on the intestines. Suśruta[3] describes the use of living black ants to close the incisions on the walls of the intestines, during the operation for intestinal obstruction, after removing the scyballi, stones, etc. He advises us to remove the bodies of the ants, leaving their heads fixed on the margins of the incision,

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[1] केशवेष्टित्याङ्गुला तस्याः कण्ठं प्रघर्षयेत् ।

Yogaratnākara, P. 437.

[2] सीव्येत् सूक्ष्मेण सूत्रेण वल्केनाश्मन्तकस्य वा ।
सनजक्षौमसूत्राभ्यां स्नायुना वालेन वा पुनः ॥
मूर्व्वागुडूचीतानैर्वा ।

Suśruta Saṁhitā, I. xxv.

स्नायुना सूत्रेण वल्कलैः ।
सीव्येन्न दूरे नासन्ने गृहान्नाल्पं न वा बहु ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxix.

[3] परिस्राविण्यप्येवमेव शल्यमुद्धृत्यान्त्रस्रावान् संशोध्य तच्छिद्रमन्त्रं समाधाय कृष्णपिपीलिकाभिर्दंशयेत् दष्टे च तासां कायानपहरेन्न सिरांसि ततः पूर्व्ववत् सीव्येत् ।

Suśruta Saṁhitā, IV. xiv.

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in the act of biting. Then the intestines should be replaced with the ants' heads sticking to them. Caraka[1] also describes the use of ants for obliteration of small perforations in the intestines, but he takes away the ants before replacing the gut into the abdominal cavity. If by any accident, the abdominal muscles be incised and the intestines come out of a gaping wound, Suśruta recommends us to allow black ants to bite the exposed coils of intestines before replacing them into the abdomen[2]. This is a curious practice of ancient surgery of the Hindus. The Greeks and Arabs never mentioned it. "Amongst some Indian tribes, it is customary to allow both edges of a wound to be seized by the sharp head-nippers of certain ants, whose bodies are then rapidly cut off; one ant after another being used, the wound is closed."[3]

Suśruta describes four sorts of sutures, *viz*:

1. Vellitaka or winding.
2. Gophaṇikā or like a sling.
3. Tunna sevanī or continued sutures.
4. Ṛjugranthi or interrupted sutures.

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[1] छिद्राण्यन्त्रस्य तु स्थूलैर्दंशयित्वा पिपीलिकैः।
बहुशः संगृहीतानि मत्वा च्छित्वा पिपीलिकान्।
प्रतियोगैः प्रवेश्यान्त्रं बहिः सीव्येद व्रणं ततः॥

Caraka Saṁhitā, VI. xviii.

[2] अभिन्नमन्त्रं निष्क्रान्तं प्रवेश्यं नान्यथा भवेत्।
पिपीलिकाशिरोग्रस्तं तदार्या के वदन्ति तु॥
प्रचाल्य पयसा दिग्धं व्रणशोणित पांशुभिः।
प्रवेशयेत् कृत्तनखो घृतेनाक्तं शनैः शनैः॥

Suśruta Saṁhitā, IV. ii.

[3] Neuburger's History of Medicine. Playfair's Translation, Vol. I., P. 9

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These are advised to be so applied as they may suit the different parts of the body[1]. The needles must not be introduced either too far from, or too close to the edges of the wound. In the former case, the lips of the wound shall be inflamed and so cause pain, while in the latter, the sutures will give way".

The use of horse-hair as a material for suturing wounds was unknown to the Greeks and Romans. They used sutures of flax and woollen threads for wounds. Paul says: "Afterwards we unite the seperated parts with a needle containing a woollen thread, being satisfied with two sutures."[2] Celsus[3] advises us to use sutures of soft thread; and the apolinose of Hippocrates[4] is directed to be made of crude flax.

17. Aśvakaṭaka. THE RING OF A HORSE'S BRIDLE.

Suśruta says that when the arrow is firmly fixed in the bone and if it can not be extracted by forcible pulling by hands or instruments, it should be tied to the ring of a horse's bridle. Then the animal is to be whipped, when by the sudden movement of the horse, the weapon would be jerked out of the wound[5].

18. Śākhā OR BRANCH OF A TREE.

Another method is to tie such an arrow by means of a rope

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[1] सीव्येदेक्षितकं शनैः।
सीव्येद्वीफणिकां वापि सीव्येद्वा तुन्नसेवनीं।
ऋजुगन्थिमथो वापि यथायोगमथापि वा॥
Suśruta Saṁhitā, I. xxv.

[2] Paulus Ægineta, VI. xii. Adam's Translations.

[3] Celsus, V. xxvi.

[4] Hippocrates, iii. 132.

[5] अश्ववल्लकटके वा बध्नीयादथैनं कशया ताड़येद्यथोन्नमयन् शिरोवेगेन शल्यमुद्धरति।
Suśruta Saṁhitā, I. xxvii.

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to the branch of a tree, lowered by pressure[1]. When the pressure is released, the branch suddenly goes high up, and thereby it pulls the weapon out of the wound[2]. Dallana, however, mentions another view that a bridle-ring and a branch of a tree are both required for the extraction of foreign bodies[3]. Hœrnle remarks: "The branch apparently is put through the ring to afford a stronger pull"[4]. Vāgbhaṭa[5] also mentions these contrivances.

19. Ṣṭhīvana or spittle.

Dallana[6] understands by it—"throwing out expectoration and saliva by the mouth." By this means any foreign body lodged in the oral cavity, such as in the gums, fauces, may easily be got rid of.

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[1] दृढां वा वृक्षशाखामवनम्य तासां पूर्ववदवङ्गोद्धरेत्।
Suśruta Saṁhitā, I. xxvii.

[2] शाखा, वृक्षशाखा, वङ्गायास विनमितायां शाखायां शल्यायभागं दृढं वङ्गा, सहसा शाखात्यागेन उक्षिप्तया शाखया शल्यमुध्रियते।
Vāgbhaṭārtha Kaumudī, I. xxv.

[3] अन्ये त्वेवं पठन्ति अशक्यमेवं वा वलवद्भिः सुपरिग्रहितस्य यन्त्रेणैनं गाहयित्वा शल्यसावङ्गं प्रविभज्य धनुर्गुणैर्व्वङ्गैकतःशाखाश्ववक्त्रकटके वध्नीयात्। अथैनम् इत्यत्र कारकेक पाठः कशया ताड़येत् यथोन्नमयन् शिरोवेगेन शल्यमुद्धरति, नमितायां पश्चाङ्गायां वृक्षशाखायां व पूर्ववद वङ्गोद्धरेदिति॥
Nivandha Saṁgraha, I. xxvii.

* The Suśruta Saṁhitā. Bibliotheca Indica. P. 48. foot note 109.

[5] तथाप्यशक्ये वारङ्गं वक्त्रीकृत्य धनुर्ज्यया।
सुवङ्गं वक्त्रकटके वध्नीयात् सुसमाहितः॥
सुसंयतस्य पश्चाङ्गा वाजिनः कशयथ तम्।
ताड़येदिति मूर्द्धानं वेगेनोन्नमयन् यथा॥
उद्धरेच्छल्यमेवं वा शाखायां कल्पयेत्तरोः।
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[6] ष्ठीवणं श्लेष्मादिनिरसनम्।
Nivandha Saṁgraha, I. vii.

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20. Provāhana or fluxing the patient.

This comprises the acts of emesis, purgation and lacrymal secretion. Thus the foreign bodies lodged in the alimentary canal or eyes may be got rid of by causing discharges from the bowels, the stomach, or the eyes[1].

21. Harṣa or objects exciting happiness.

Persons suffering from vraṇa or wound are directed to have their minds in a state of cheerfulness by the sight of objects exciting happiness[2]. A cheerful man is a better subject for a surgical operation than a morose and gloomy one. Vāgbhaṭa[3] adds fear as an accessory instrument. Joy and fear cause a sudden change in the temper of a man and so may be of some help in curing diseases[4]. Suśruta regards, sorrow as a śalya or foreign body which is to be removed by joy.[5]

22. Ayaṣkānta or load-stone.

Magnet was known to the ancient Hindus[6] and they used it

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[1] तवाशुचवधूद्गार कास सूव पूरीषानिलै: स्वभाववलप्रवृत्तै नयनादिभ्य: पतति।
Suśruta Sāṁhitā, I. xxvii.

[2] सुहृदो विचित्रिपन्त्याशु कथाभिर्व्रणवेदना:।
आश्वासयन्ती वहुशस्त्वनुकूला: प्रियम्वदा: ॥
* * * *
सम्यदाद्यनुकूलाभि: कथाभि: प्रीतिनानस:।
आशावान् व्याधिमोचाय क्षिप्रं सुखमवाप्नुयात् ॥
Suśruta Saṁhitā, I. xix.

[3] See foot-note 1, P. 98.

[4] भय हर्षौ शरीरस्य सहसा भावान्तरमुत्पादयन्तौ यन्त्रकार्य्यं कुरुत इति।
Vāgbhaṭārtha Kaumudī, I. xxv.

[5] हृद्यवस्थित मनेक कारणोत्पन्नं शोकशल्यं हर्षेणेति।
Suśruta Saṁhitā, I. xxvii.

[6] मणिगमनं सूच्यभिसर्पणमदृष्टकारणकं।
Vaiśeṣikā Darśanam, Ch. V. Āhnika 15.

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